VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

FINAL PERMIT FOR THE STORAGE AND TREATMENT OF HAZARDOUS WASTE

RADFORD ARMY AMMUNITION PLANT
RADFORD, VIRGINIA
EPA I.D. #: VA1210020730
December 17, 2021

Commonwealth of Virginia

VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

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PERMIT FOR THE STORAGE AND TREATMENT OF HAZARDOUS WASTE

Permittee: Radford Army Ammunition Plant and BAE Systems, Inc.
4050 Peppers Ferry Road
Radford, VA 24143

EPA I.D. #: VA1210020730

Pursuant to Chapter 14, Article 4, Title 10.1, Code of Virginia (1950), as amended, and regulations promulgated thereunder by the Virginia Department of Environmental Quality, a Hazardous Waste Management Permit is issued to the United States Army and to BAE Systems, Inc. at Radford, Virginia (hereinafter referred to as the Permit and the Permittee), to store and treat hazardous waste in tanks; and to treat hazardous waste by incineration, located in Montgomery County, Virginia at latitude 37°11' North and longitude 80°30' West.

The Permittee shall comply with all terms and conditions set forth in this Permit including all Permit Attachments II.A through V.Aa. If the Permit and the Permit Attachments conflict, the wording of the Permit shall prevail. The Permittee shall also comply with all applicable regulations contained in the Virginia Hazardous Waste Management Regulations (VHWMR) as codified in Title 9 of the Virginia Administrative Code, Agency 20, Chapter 60 (9 VAC 20-60), and the *Resource Conservation and Recovery Act (RCRA)* Regulations under 40 CFR Parts 124, 260, 261, 262, 264, 265, 268, and 270 as adopted by reference in the VHWMR. (For convenience, wherever the RCRA regulations are adopted by reference and cited in this Permit and the Permit Attachments, the regulatory citations will be only those from 40 CFR).

The Commonwealth of Virginia has received authorization for its hazardous waste management program under Section 3006(b) of the RCRA, 42 U.S.C. § 6926(b), to administer and enforce the RCRA under the VHWMR in lieu of the federal hazardous waste management program. Applicable regulations are those under the VHWMR (9 VAC 20-60) and the RCRA which are in effect on the date of final administrative action on this Permit and as well as any self-implementing statutory provisions and related regulations which are automatically applicable to the Permittee's hazardous waste management activities, notwithstanding the conditions of this Permit.

This Permit is based on the administrative record and the assumption that the information submitted by the Permittee and contained in the administrative record is complete and accurate. The Permittee's failure in the application, or during the permit issuance process, to fully disclose all relevant facts, or the Permittee's misrepresentation of any relevant facts at any time, shall be grounds for the modification or termination of this Permit pursuant to 40 CFR § 124.5, § 270.41, §270.42, and §270.43, and shall also be grounds for initiation of an enforcement action. The Permittee shall inform the Department of any deviations from Permit Conditions or changes in the information provided in the application. In particular, the Permittee shall inform the Department of any proposed changes that might affect the ability of the Permittee to comply with applicable regulations and/or Permit Conditions, or which alter any of the conditions of the Permit in any way.

This Permit is effective as of **January 16, 2022**, and shall remain in effect until **January 16, 2032** unless revoked and reissued in accordance with 40 CFR §124.5 and § 270.41, terminated in accordance with 40 CFR §270.43, or continued in accordance with 9 VAC 20-60-270.B.15.

December 17, 2021
____
Date Signed

Leslie A. Romanchik
____
Leslie A. Romanchik
Hazardous Waste Program Manager
Office of Financial Responsibility and Waste Programs

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LIST OF ATTACHMENTS

The following Attachments are incorporated, in their entirety, by reference into this Permit. These incorporated attachments are enforceable conditions of this Permit. Some of the documents contain excerpts from the Permittee' Hazardous Waste Permit Application. The Department has, as deemed necessary, modified specific language excerpted from the permit application. Additional modifications are prescribed in the Permit Conditions (Modules I through VI), and thereby supersede the language of the attachments. Facility operations shall be in accordance with the contents of the Attachments and this Permit.

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DEFINITIONS

All definitions contained in 40 CFR Sections 124.2, 260.10, 270.2, 264.141, 264.1031, 264.1051, 264.1081, and 9 VAC 20-60 are hereby incorporated, in their entirety, by reference into this Permit. Any of the definitions used below, (a) through (l), shall supersede any definition of the same term given in 40 CFR Sections 124.2, 260.10, 270.2, 264.141, 264.1031, 264.1051,264.1081, and 9 VAC 20-60. Where terms are not defined in the regulations or the Permit, the meaning associated with such terms shall be defined by a standard dictionary reference or the generally accepted scientific or industrial meaning of the term.

Throughout the permit, all references to 40 CFR parts 261-266, 268, 270, 273, 279, are as adopted by reference in the Virginia Hazardous Waste Management Regulations, 9 VAC 20-60.

For the purposes of this Permit, the following definitions shall apply:

a. The term “Days” shall mean calendar days except as otherwise provided therein.

b. The term “Department” shall mean the Virginia Department of Environmental Quality (with the address specified in Permit Condition I.I.2.)

c. The term “Director” shall mean the Director of the Department of Environmental Quality or his designated representative.

d. The term "EPA" shall mean the United States Environmental Protection Agency.

e. The term "Facility" or “Site” shall mean all contiguous land and structures, other appurtenances, and improvements on the land used for treating, storing, or disposing of hazardous waste under the control of either the United States Army or BAE Systems, Ordnance Systems, Inc. (BAE) as identified in the physical description of the property (including structures, appurtenances, and improvements) set forth in Attachment II.A of Module II in this Permit.

f. The term "Hazardous waste" shall mean a hazardous waste as defined in Title 40 Code of Federal Regulations (CFR) Section 261.3.

g. The term “Hazardous Constituent” shall include constituents identified in 40 CFR part 264, Appendix IX in addition to those in 40 CFR part 261, Appendix VIII, as defined in 9 VAC 20-60-264.B.6.

h. The term "Operating record" shall mean written or electronic records of all maintenance, monitoring, inspection, calibration, or performance testing or other data as may be required to demonstrate compliance with this Permit, document noncompliance with this Permit, or document actions taken to remedy noncompliance with this Permit. Minimum lists of documents that must be included in the operating record are identified at 40 CFR §264.73(b).

i. The term "Permittee" shall mean the owner/operator of the facility to which the permit is issued and refers to both the U. S. Army and BAE Systems, Ordnance Systems, Inc.

j. The term "RCRA" shall mean the Resource Conservation and Recovery Act of 1980 as amended by HSWA in 1984.

k. The term "RCRA Permit" shall mean the full permit, with RCRA and HSWA portions.

l. The acronym "TEQ" shall mean toxicity equivalent quotient, the international method of relating the toxicity of various dioxin/furan congeners to the toxicity of 2,3,7,8-TCDD

ABBREVIATIONS AND ACRONYMS

For the purposes of this Permit, the following abbreviations and acronyms shall apply:

APC	Air Pollution Control
API	American Petroleum Institute
ASME	American Society of Mechanical Engineers
ASTM	American Society of Testing and Materials
ATV	All-Terrain Vehicle
BAE	BAE Systems, Ordnance Systems, Inc.
BFE	Base Flood Elevation
CBC	Contained Burn Chamber
cfm	cubic feet per minute
CFR	Code of Federal Regulations
CMS	Corrective Measures Study
CPT	Comprehensive performance test
DA	Department of the Army
DDT	Deflagration/4-strike detonation/transition
DEG	Diethylene glycol
DEGDN	Diethylene glycol dinitrate
DEQ	Virginia Department of Environmental Quality
DNT	Dinitrotoluene
DOD	Department of Defense
DOT	Department of Transportation

EC	Emergency Coordinator
ECW	Energetic contaminated waste
EW	Energetic waste
EWI-CWP	Energetic Waste Incinerator/Contaminated Waste Processor
°F	Degrees Fahrenheit
FOD	Foreign object debris
GOCO	Government owned, contractor operated
HAZMAT	Hazardous materials
HDPE	High density polyethylene
Hp	horsepower
HWC	hazardous waste combustor
HWMU	Hazardous waste management unit
IBL	Internal ballistic laboratory
ID	Induced draft
ISC	Incident site commander
ITAR	International Traffic in Arms Regulations
LEPC	Local Emergency Planning Committee
MCC	Motor control center
MMBtu/hr	Million British thermal units per hour
MPPEH	Material Potentially Presenting an Explosive Hazard
NESHAP	National Emission Standards for Hazardous Air Pollutants
NOS	Not otherwise specified

NOx	Nitrogen oxides
NRE	New River Energetics
NSDD	National Security Decision Directive
OCC	Operations control center
OMB	Office of Management and Budget
OPSEC	Operational Security
P&ID	Piping and instrumentation diagram
PIF	Performance influencing factor
PLC	Programmable logic controller
PPE	Personal protective equipment
Psig	pounds per square inch gage
RFAAP	Radford Army Ammunition Plant
RFI	RCRA Facility Investigation
RKI	Rotary kiln incinerator
Rpm	Revolutions per minute
RQ	reportable quantity
SCC	Secondary combustion chamber
SCR	Selective catalytic reduction
SESOIL	Seasonal Soil Compartment Model
SWMU	Solid waste management unit
TAL	Technical analytical laboratory
TCLP	Toxicity characteristic leaching procedure

UCMJ	Uniform code of military justice
USA/JMC	United States Army/Joint Munitions Command
VAC	Virginia Administrative Code
VELAP	Virginia Environmental Laboratory Accreditation Program
VHWMR	Virginia Hazardous Waste Management Regulations
VPDES	Virginia Pollutant Discharge Elimination System
WWTP	Wastewater Treatment Plant

If, subsequent to the issuance of this Permit, regulations are promulgated which redefine any of the above terms, the Department may, at its discretion, apply the new definition, abbreviation, and acronyms to this Permit.

Module I - Standard Conditions

I.A. EFFECT OF PERMIT

This Permit, issued by the Director pursuant to 40 CFR §270.1(c)(4), authorizes only the management of hazardous waste expressly described in this Permit and in accordance with the conditions of this Permit and with the applicable provisions of the VHWMR under 9 VAC 20-60. Any management of hazardous waste by the Permittee which is not authorized by this Permit or 9 VAC 20-60, and for which a permit is required under Chapter 14, Article 4, Title 10.1, Code of Virginia (1950), as amended, is prohibited. Compliance with this Permit generally constitutes compliance, for the purposes of enforcement, with Chapter 14, Article 4, Title 10.1-1426, Code of Virginia (1950), as amended. This Permit does not convey any property rights of any sort, or any exclusive privilege. Possession of a permit does not authorize any injury to persons or property or invasion of other private rights, or any infringement of Commonwealth or local laws or regulations. Compliance with the terms of this Permit may not constitute a defense to any action brought under Chapter 14, Article 8, Code of Virginia (1950), as amended, or any other Commonwealth law governing protection of the public or the environment. (40 CFR §§ 270.30(g) and 270.4(b) and (c))

I.B. PERMIT ACTIONS

I.B.1. This Permit may be modified, revoked and reissued, or terminated for cause as specified in 40 CFR §§124.5, 270.30(f), 270.41, and 270.43. The filing of a request by the Permittee for a permit modification, revocation and reissuance, or termination, or the notification of planned changes or anticipated noncompliance does not stay the applicability or enforceability of any permit condition (40 CFR §270.30(f)).

I.B.2. Permit modifications at the request of the Permittee shall be done as specified by 40 CFR §270.42.

I.B.3. This permit may be renewed as specified in 9 VAC 20-60-270.B.6 and 40 CFR § 270.10(h), and Permit Condition I.D.2. Review of any application for a permit renewal shall consider improvements in the state of control and measurement technology, as well as changes in applicable regulations.

I.C. SEVERABILITY

I.C.1. The provisions of this Permit are severable, and if any provision of this Permit or the application of any provision of this Permit to any circumstance is held invalid, the application of such provision to other circumstances and the remainder of this Permit shall not be affected thereby. Invalidation of any Commonwealth or Federal statutory or regulatory provision which forms the basis for any condition of this Permit does not affect the validity of any other Commonwealth or Federal statutory or regulatory basis for said condition (40 CFR § 124.16(a)(2)).

I.C.2. In the event that any conditions of this Permit are stayed for any reason, the Permittee shall continue to comply with the conditions of the existing permit which correspond to the stayed conditions until final resolution of the stayed conditions, unless the Director determines compliance with the existing conditions would be technologically incompatible with compliance with other conditions of this Permit which have not been stayed. (40 CFR § 124.16(c))

I.D. DUTIES AND REQUIREMENTS

I.D.1. Duty to Comply

The Permittee shall comply with all conditions of this Permit, except that the Permittee need not comply with the conditions of this Permit to the extent and for the duration such noncompliance is authorized by an emergency permit under 40 CFR §270.61. Any other noncompliance with the Permit, constitutes a violation of Title 10.1 Code of Virginia (1950), as amended and regulations promulgated thereunder is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application (40 CFR §270.30(a)).

I.D.2. Duty to Reapply

If the Permittee wishes to continue or is required to continue an activity regulated by this Permit after the expiration date of this Permit, the Permittee shall apply for and obtain a new permit as specified below.

a. The Permittee shall submit a new application at least 180 days before the expiration date of the Permit, unless a later date has been granted by the Director (40 CFR §270.30(b)).

b. Pursuant to 40 CFR §270.10(h), the Director shall not grant permission for an application to be submitted later than the expiration date of the existing permit.

I.D.3. Need to Halt or Reduce Activity Not a Defense

It shall not be a defense for the Permittee in an enforcement action to argue that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this Permit (40 CFR §270.30(c)).

I.D.4. Duty to Mitigate

In the event of noncompliance with the Permit, the Permittee shall take all reasonable steps to minimize releases to the environment, and shall carry out such measures as are reasonable to prevent significant adverse impacts on human health or the environment (40 CFR § 270.30(d)).

I.D.5. Proper Operation and Maintenance

The Permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the Permittee to achieve compliance with the conditions of this Permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of this Permit (40 CFR § 270.30(e)).

I.D.6. Duty to Provide Information

The Permittee shall furnish to the Director within a reasonable time, any pertinent information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this Permit; or to determine compliance with this Permit. The Permittee shall also furnish to the Director, upon request, copies of records required to be kept by this Permit (40 CFR § 270.30(h)).

I.D.7. Inspection and Entry

The Permittee shall allow the Director or an authorized representative, upon the presentation of credentials and other documents as may be required by law to:

a. Enter at reasonable times upon the Permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this Permit;

b. Have access to and copy, at reasonable times, any records that must be kept under conditions of this Permit;

c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Permit; and

d. Sample or monitor at reasonable times for the purposes of assuring permit compliance or as otherwise authorized by 9 VAC 20-60, any substances or parameters at any location (40 CFR § 270.30(i)).

I.D.8. Reporting Planned Changes

The Permittee shall give notice to the Director as soon as possible of any planned physical alterations or additions to the permitted facility (40 CFR § 270.30(l)). This notice shall include a description of all incidents of noncompliance reasonably expected to result from the proposed changes.

I.D.9. Anticipated Noncompliance

The Permittee shall give advance written notice to the Director of any planned changes in the permitted facility or activity that may result in noncompliance with Permit requirements (40 CFR § 270.30(l)(2)).

I.D.10. New and Modified Portions of Any Waste Management Unit

The Permittee shall not store or treat hazardous waste in any new or modified portion of the hazardous waste management unit, except as provided in 40 CFR §270.42, until the Permittee has submitted to the Director, by certified mail or hand delivery, a letter signed by the Permittee and a professional engineer registered by the Commonwealth, stating that the facility has been constructed or modified in compliance with the Permit; and:

a. The Director has inspected the modified or newly constructed facility and finds it is in compliance with the conditions of the Permit; or

b. Within 15 days of the date of submission of the letter required pursuant to Permit Condition I.D.10, if the Permittee have not received notice from the Director of his intent to inspect, prior inspection is waived and the Permittee may commence storage or treatment of hazardous waste.

I.D.11. Twenty-four Hour Reporting

The Permittee shall report to the Director any noncompliance which may endanger human health or the environment. Information shall be provided orally as required by 40 CFR §270.30(l)(6) within twenty-four (24) hours from the time the Permittee becomes aware of the circumstances. The information specified in a., b., and c. below shall be included as information that shall be reported orally within 24 hours.

a. Information concerning the release of any hazardous waste that may cause an endangerment to public drinking water supplies shall be reported.

b. Any information of a release or discharge of hazardous waste, or of a fire or explosion at the facility, that could threaten the environment or human health outside the facility shall be reported.

c. The description of the occurrence and its cause shall include:

   i. Name, address, and telephone number of the owner or operator;

   ii. Name, address, and telephone number of the facility;

   iii. Date, time, and type of incident;

   iv. Names and quantities of material(s) involved;

   v. The extent of injuries, if any;

   vi. An assessment of actual or potential hazard to the environment and human health outside the facility, where this is applicable; and

   vii. Estimated quantity and disposition of recovered material that resulted from the incident (40 CFR § 270.30(l)(6)).

d. A written submission shall also be provided to the Director within five (5) days of the time the Permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the periods of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance. The Director may waive the 5-day notice requirement in favor of a written report within fifteen (15) days (40 CFR § 270.30(l)(6)).

I.D.12. Other Noncompliance

The Permittee shall report all other instances of noncompliance not otherwise reported pursuant to Permit Conditions I.D.11, I.D.13, and I.E.1 at the time monitoring reports are submitted. The reports shall contain the information listed in Permit Condition I.D.11 (40 CFR § 270.30(l)(10)).

I.D.13. Other Information

Whenever the Permittee becomes aware that it failed to submit any relevant facts in the permit application, or submitted incorrect information in a permit application or in any report to the Director, the Permittee shall promptly submit such facts or information to the Director (40 CFR § 270.30(l)(11)).

I.E. MONITORING AND RECORDS

I.E.1. Monitoring Reports

Monitoring shall be performed and results shall be reported at the intervals specified in the Permit.

I.E.2. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity (40 CFR § 270.30(j)(1)). The method used to obtain a representative sample of the waste to be analyzed must be the appropriate method specified in 40 CFR Part 261, Appendix I, an equivalent method approved by the EPA or a method specified in this Permit. Laboratory methods must be those specified in Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, SW-846 (3rd ed.; November, 1986, as updated), Standard Methods of Wastewater Analysis (16th ed.; 1985, as updated), or an equivalent method approved by the EPA. Additionally, the laboratory must be accredited for the analytical method, matrix and target analyte (where applicable) by the Virginia Environmental Laboratory Accreditation Program (VLAP).

I.E.3. The Permittee shall retain records of all monitoring information, including all calibration and maintenance records, for all continuous monitoring instrumentation, copies of all reports and records required by this Permit, all certifications required by 40 CFR §264.73(b)(9), and records of all data used to complete the application for this Permit, for a period of at least 3 years (or longer if specified elsewhere in this Permit) from the date of the sample collection, measurement, report, certification, or application. These retention periods may be extended by the request of the Director at any time and are automatically extended during the course of any unresolved enforcement actions regarding this facility.

Records of monitoring information shall include at a minimum:

a. The date, exact place, and time of sampling or measurements;

b. The individual(s) who performed the sampling or measurements;

c. The date(s) analyses were performed;

d. The individual(s) who performed the analyses;

e. The analytical techniques or methods used; and

f. The results of such analyses (40 CFR § 270.30(j)).

I.F. COMPLIANCE NOT CONSTITUTING DEFENSE

Compliance with the terms of this Permit does not constitute a defense to any action brought under Chapter 14, Article 8 of Title 10.1, Code of Virginia (1950) as amended or any other Commonwealth law governing protection of the public or the environment.

I.G. TRANSFER OF PERMITS

This Permit is not transferrable to any person except after notice to the Director (40 CFR §270.30(l)(3)). The Director may require modification or revocation and reissuance pursuant to 40 CFR §§124.5, 270.40, 270.41, 270.42, and 270.43 to change the name of the Permittee and incorporate such other requirements as may be necessary. Before transferring ownership or operation of the facility during its operating life, the Permittee shall notify the new owner or operator in writing of the requirements of 9 VAC 20-60-264 and 40 CFR Parts 264 and 270 and at the same time shall send a copy of such notice to the Director (40 CFR §264.12(c)).

I.H. PERMIT EXPIRATION AND CONTINUATION

Pursuant to 9 VAC 20-60-270 B 15 this Permit will remain in force until the effective date of a new permit if the Permittee has submitted a timely, complete application pursuant to Permit Condition I.D.2.a and through no fault of the Permittee, the Director has not issued a new permit with an effective date on or before the expiration date of this Permit. All conditions of the continued Permit shall remain fully effective and enforceable

I.I. REPORTS, NOTIFICATIONS, AND SUBMISSIONS TO THE DEPARTMENT

I.I.1. Biennial Report

The Permittee shall submit a biennial report to the Department by March 1 of every even numbered year which covers facility activities during the previous calendar years. At a minimum this report will include:

a. The generator biennial report pursuant to 40 CFR §262.41; and

b. The hazardous waste management facility biennial report pursuant to 40 CFR §270.30(l)(9) and § 264.75.

I.I.2. All reports, notifications or other submissions which are required by this Permit are to be sent electronically, by postal mail or be hand-delivered to:

Hazardous Waste Program Manager
Department of Environmental Quality
Office of Financial Responsibility and Waste Programs
PO Box 1105
Richmond, Virginia 23218

Street Address:
1111 East Main Street, Suite 1400
Richmond, VA 23219

And one (1) copy of all such correspondence, reports, and submissions shall also be sent electronically to:

Land Program Manager, Blue Ridge Regional Office
Department of Environmental Quality
901 Russell Drive
Salem, VA 24153

Virginia Program Manager,
Land Chemicals and Redevelopment Division
Environmental Protection Agency, Region III
1650 Arch Street
Philadelphia, PA 19103-2029

I.I.3. Signatory Requirements

All applications, reports, or information submitted to the Director shall be signed and certified as specified by 40 CFR §270.11.

I.J. DOCUMENTS TO BE MAINTAINED AT THE FACILITY SITE

I.J.1. Current copies of the following documents, as amended, revised, and modified, shall be maintained at the facility. These documents shall be maintained until closure is completed and certified by the Permittee and by an independent, Virginia-registered professional engineer, unless a lesser time is specified in the Permit.

a. The Permit, including all attachments;

b. All Part B Permit Applications supporting the Permit;

c. The facility operating record required by 40 CFR §264.73, Permit Condition II.I.2.;

d. Waste Analysis Plan required by 40 CFR § 264.13 and this Permit.

e. Inspection schedules and logs required by 40 CFR §§264.15(b)(2) and 264.15(d);

f. Personnel training documents and records required by 40 CFR §264.16 and this Permit;

g. Contingency Plan as required by 40 CFR § 264.53(a) and this Permit.

h. Closure Plans, as required by 40 CFR §264.112(a) and this Permit; and

i. All other documents required by Permit Conditions I.D.8 through I.D.13 and I.E.

I.K. APPROVAL/DISAPPROVAL OF SUBMISSIONS

I.K.1. The Department will review the plans, reports, schedules and other documents (hereinafter collectively referred to as "submissions") submitted which require the Director's or Department's approval. The Department will notify the Permittee in writing of the Department's approval, conditional approval, or disapproval of each submission.

I.K.2. Each submission required by this Permit, upon approval by the Director, is incorporated into this Permit. Any noncompliance with a Department-approved submission shall be deemed as noncompliance with this Permit. A conditionally approved submission, including any terms of such conditional approval set forth in Department's decision, shall constitute the Department-approved submission and shall be incorporated into this Permit.

I.K.3. In the event of the Department's conditional approval of submission, the Department shall specify in writing any deficiencies in the submission and the terms upon which approval of the submission is conditioned. If the Permittee disputes any term upon which approval of the submission was conditioned, the Permittee may initiate Dispute Resolution pursuant to Permit Condition I.L

I.K.4. In the event of the Department's disapproval of a submission, the Director or the Department shall specify the deficiencies in writing. The Permittee shall modify the submission to correct/address the specified deficiencies within a reasonable time period established by the Department taking into account the tasks to be performed, and submit the revised submission to the Department for approval.

I.K.5. If the revised submission is disapproved, the Director or the Department will notify the Permittee of the deficiencies in writing and specify a schedule for the

Permittee to correct the deficiencies and resubmit the submission to the Department. The Permittee shall correct the deficiencies as directed by the Department, and forward the revised submission within the time period specified by Department. In the event the Permittee disagrees with the Department’s disapproval of the revised submission, the Permittee shall notify the Department in writing and the disagreement shall be resolved in accordance with the Dispute Resolution provision in Permit Condition I.L of this Permit.

I.L. DISPUTE RESOLUTION

I.L.1. Except as otherwise provided in this Permit, in the event the Permittee disagrees, in whole or in part, with Department disapproval of any submission required by this Permit, the Permittee shall notify the Department in writing of its objections, and the basis thereof, within fourteen (14) days of receipt of the Department's disapproval. Such notice shall set forth the specific matters in dispute, the position(s) the Permittee asserts which should be adopted as consistent with the requirements of the Permit, the basis for the Permittee's position, and supporting documentation considered necessary for the Department's determination.

I.L.2. The Department and the Permittee shall have an additional fourteen (14) days from the Department's receipt of the notification to meet or confer to resolve any disagreement/dispute. In the event agreement is reached, the Permittee shall submit the revised submission and implement the same in accordance with such agreement.

I.L.3. In the event the Permittee and the Department are not able to reach an agreement on the dispute items within the additional 14-day period, the Department will notify the Permittee in writing of its decision on the dispute and the Permittee shall comply with the terms and conditions of the Department's decision in the dispute. The Permittee does not waive its right to assert any and all available defenses in a proceeding to enforce this Permit.

I.L.4. In the event the Permittee disagrees with the Department’s disapproval of a submission or revised submission and the Department’s written decision regarding dispute items, the Permittee may file an appeal with the Director within 30 days of the disapproval (as provided for in Rule 2A:2 of the Supreme Court of Virginia).

I.M. TRADE SECRET PROTECTION

In accordance with §10.1-1458 of the Code of Virginia (1950, as amended), the permittee may claim any information this permit requires, or is otherwise submitted to the Director as trade secret. In doing so, the permittee shall: 1) assert any such claim at the time of submittal, 2) identify the data or materials for which protection is being sought, and 3) state the reasons why protection is necessary.

Further information regarding trade secret protection, the basis for submittal of such a request, the Department's decision process and handling of trade secret protected information is available on the Virginia Regulatory Town Hall website (http://townhall.virginia.gov/L/ViewGDoc.cfm?gdid=5322). If no claim is made at the time of submittal, the Director may make the information available to the public without further notice. The permittee has the burden of substantiating that the claimed information is trade secret, and the Department may request further information regarding such claim, and may reasonably determine which such information to treat as trade secret. The Department may disclose trade secret information to the appropriate officials of the Environmental Protection Agency pursuant to the requirements of the federal Solid Waste Disposal Act, 42 U.S.C. § 3251, *et seq*., or as otherwise required by law.

I.N. REGULATORY REFERENCES FOR APPLICABLE REQUIREMENTS AND SITE-SPECIFIC CONSIDERATIONS

I.N.1. Any changes to the facility or unit operations reported under Condition I.D.8 shall be provided in accordance with 40 CFR §270.30(l)(1). If these changes will require a permit modification, the Permittee shall prepare a modification request as required by 40 CFR §270.42. This request shall specify the exact change to be made to the permit conditions and any supporting documents referenced by the permit. In addition, this request shall include all applicable information required by 40 CFR §§270.13 through 270.21, 270.62, and 270.63.

I.N.2. Any anticipated non-compliance report under Condition I.D.9 shall be provided in accordance with 40 CFR §270.30(l)(2).

I.N.3. Oral reporting of events triggering a 24-hour reporting requirement under Condition 1.D.11 shall be provided in accordance with 40 CFR §270.30(l)(6)(iii).

I.N.4. In lieu of conducting sampling under Condition I.E.2 following standard procedures, the Permittee may conduct sampling pursuant to site-specific methods approved by the Virginia Department of Environmental Quality (DEQ) in the Waste Analysis Plan (Attachment II.B and II.Ba, as applicable). Any approved alternative methods must be VELAP certified.

I.N.5. Final as-built design specifications will be submitted to DEQ to replace the Design Specifications for Subpart CC Tank Controls included in Attachment III.Ba for inclusion in this permit prior to operation.

I.N.6. RFAAP shall submit a Construction Schedule for the EWI-CWP to the Department within 90 days of issuance of this Permit for incorporation into this Permit by a Class 1 modification. The Construction Schedule shall detail the anticipated design implementation steps and anticipated timeline for construction and operational milestones for the EWI-CWP complex. If RFAAP is unable to meet any of the anticipated milestones due to a force majeure event, as defined in the following condition, RFAAP shall follow the notification and reporting requirements detailed in Condition I.N.7.

I.N.7. "Force majeure," for purposes of this Construction Schedule, is defined as any event arising from causes beyond the control of RFAAP, of any entity controlled by RFAAP, or of RFAAP's contractors that delays or prevents (hereinafter collectively referred to as "delay") the performance of any obligation under this Construction Schedule despite RFAAP's best efforts to fulfill the obligation. The requirement that RFAAP exercise "best efforts to fulfill the obligation" includes using best efforts to anticipate any potential force majeure and best efforts to address the effects of any potential force majeure (a) as it is occurring and (b) following the potential force majeure such that the delay and any adverse effects of the delay are minimized to the greatest extent possible. "Force majeure" does not include financial inability to comply with any obligation of this Construction Schedule.

If any event occurs or has occurred that may delay the performance of any obligation under this Construction Schedule for which RFAAP intends or may intend to assert a claim of force majeure, RFAAP shall orally notify the Department, within three days of when RFAAP first knew that the event might cause a delay.

Within 14 days thereafter, RFAAP shall provide in writing to the Department an explanation and description of the reasons for the delay; the anticipated duration of the delay; all actions taken or to be taken to prevent or minimize the delay; a schedule for implementation of any measures to be taken to prevent or mitigate the delay or the effect of the delay; RFAAP's rationale for attributing such delay to a force majeure; and a statement as to whether, in the opinion of RFAAP, such event may cause or contribute to an endangerment to public health or welfare, or the environment. RFAAP shall include with any notice all available documentation supporting their claim that the delay was attributable to a force majeure. RFAAP shall be deemed to know of any circumstance of which RFAAP, any entity controlled by RFAAP, or RFAAP's contractors knew or should have known.

Failure to comply with the above requirements regarding an event shall preclude RFAAP from asserting any claim of force majeure regarding that event, provided, however, that if the Department, despite the late or incomplete notice, is able to assess to its satisfaction whether the event is a force majeure and whether RFAAP has exercised its best efforts, the Department may, in its unreviewable discretion, excuse in writing RFAAP's failure to submit timely or complete notices.

If the Department agrees that the delay or anticipated delay is attributable to a force majeure, the time for performance of the obligations under this Construction

Schedule that are affected by the force majeure will be extended by the Department for such time as is necessary to complete those obligations. An extension of the time for performance of the obligations affected by the force majeure shall not, of itself, extend the time for performance of any other obligation. If the Department do not agree that the delay or anticipated delay has been or will be caused by a force majeure, the Department will notify RFAAP in writing of its decision. If the Department agree that the delay is attributable to a force majeure, the Department will notify RFAAP in writing of the length of the extension, if any, for performance of the obligations affected by the force majeure.

I.O. ANTI-DEFICIENCY ACT

Nothing in this permit shall require a violation of the Anti-Deficiency Act, 31 U.S.C.1341. The Permittee agrees to use its best efforts to obtain all necessary funding through the appropriate authorities or source(s) to ensure the compliance with this permit. If the permittee is unable to acquire the necessary funding under this permit, then written notification will be made to the DEQ within 14 days of the Permittee’s determination of a funding deficiency. A timeline of when the permittee projects full funding will become available shall be sent to DEQ within 30 days after the written notification is sent. If appropriated funds are not available to fulfill the Permittee's obligations under this permit, DEQ reserves the right to initiate an action against any other person, or to take any response action, which would be appropriate absent this permit.

Module II - General Facility Conditions

II.A. DESIGN AND OPERATION OF FACILITY

The Permittee shall maintain and operate the facility to minimize the possibility of a fire, explosion, or any unplanned sudden or non-sudden release of hazardous waste constituents to air, soil, or surface water that could threaten human health or the environment.

II.B. WASTE ANALYSIS

II.B.1. General Waste Analysis

The Permittee shall follow the waste analysis procedures required by 40 CFR § 264.13 as described in the Waste Analysis Plan, Attachment II.B and II.Ba, as applicable. Waste analysis shall require, at a minimum, the maintenance of proper functional instruments, use of approved sampling and analytical methods, verification of the validity of sampling and analytical procedures, and correct calculations. If the Permittee does not have sufficient capability for analysis, then the Permittee shall inform the laboratory performing the analysis that the laboratory must operate under the waste analysis conditions placed on the Permittee. Additionally, the laboratory must be accredited for the analytical method, matrix and target analyte (where applicable) by the Virginia Environmental Laboratory Accreditation Program (VELAP).

II.C. SECURITY

The Permittee shall comply with the security provisions of 40 CFR §264.14. The security provisions shall follow the outline in Attachment II.G and II.Ga, as applicable.

II.D. GENERAL INSPECTION REQUIREMENTS

The Permittee shall follow the inspection schedule set out in the Inspection Schedule, Attachment II.C and II.Ca, as applicable. The Permittee shall remedy any deterioration or malfunction discovered during an inspection as required by 40 CFR §264.15(c). Records of inspections shall be kept as required by 40 CFR §264.15(d) and Permit Condition II.I.2.c.xii.

II.E. PERSONNEL TRAINING

The Permittee shall conduct personnel training as required by 40 CFR §264.16. This training program shall follow Personnel Training, Attachment II.D and II.Da, as applicable. The Permittee shall maintain training documents and records as required by 40 CFR §§264.16(d)(4) and 264.16(e) as well as Permit Conditions II.I.2.a.vii. and II.I.2.c.ix.

II.F. GENERAL REQUIREMENTS FOR REACTIVE WASTE

The Permittee shall comply with the requirements of 40 CFR §264.17. The Permittee shall follow the procedures for the handling of reactive waste detailed in Attachment IV.C and IV.Ca, as applicable. (see Module IV).

II.G. FLOODPLAIN STANDARD

The Permittee shall comply with the requirements of 40 CFR §264.18(b). The Permittee shall follow the Flood Plan in Attachment II.H and II.Ha, as applicable.

II.H. PREPAREDNESS AND PREVENTION

II.H.1. Required Equipment

At a minimum, the Permittee shall equip the facility with the equipment set forth in the Contingency Plan, Attachment II.E and II.Ea, as applicable and as required by 40 CFR §264.32.

II.H.2. Testing and Maintenance of Equipment

The Permittee shall test and maintain the equipment specified in Permit Condition II.H.2 and in Attachment II.E and II.Ea, as applicable and as necessary to assure its proper operation in time of emergency as required by 40 CFR § 264.33.

II.H.3. Access to Communications or Alarm System

The Permittee shall maintain access to the communication or alarm system as required by 40 CFR §264.34.

II.H.4. Arrangements with Local Authorities

The Permittee shall maintain arrangements with State and local authorities as required by 40 CFR §264.37. If State and local officials refuse to enter into or renew existing preparedness and prevention arrangements with the Permittee, the Permittee shall document this refusal in the operating record pursuant to Permit Condition II.J.2.d.iv.

II.I. CONTINGENCY PLAN

II.I.1. Implementation of Plan

The Permittee shall immediately carry out the provisions of the Contingency Plan, Attachment II.E and II.Ea, as applicable, and follow the emergency procedures described by 40 CFR §264.56, whenever there is an imminent or actual fire, explosion, or release of hazardous waste or constituents that threaten or could threaten human health or the environment. The Permittee shall comply with the reporting requirements provided in I.D.11.

II.I.2. Copies of Plan

The Permittee shall comply with the requirements of 40 CFR §264.53.

II.I.3. Amendments to Plan

The Permittee shall review and immediately amend, if necessary, the Contingency Plan, as required by 40 CFR §264.54.

II.I.4. Emergency Coordinator

A trained emergency coordinator shall be available at all times in case of an emergency as required by 40 CFR § 264.55. In addition, the Permittee shall comply with the requirements of 40 CFR §§ 264.52 (d).

II.I.5. Emergency Procedures

The Permittee shall comply with the requirements of 40 CFR §264.56 including the recordkeeping and reporting requirements specified in Permit Condition II.J.2.c.vi.

II.J. RECORDKEEPING AND REPORTING

II.J.1. Notification, Certification, and Recordkeeping Requirements

In addition to the recordkeeping and reporting requirements specified elsewhere in this Permit, the Permittee shall comply with all applicable notification, certification, and recordkeeping requirements described in 40 CFR §§264.73(b)(12) and 268.7.

II.J.2. Operating Record

The Permittee shall maintain a written operating record at the facility, consisting of records kept for the lengths of time specified below. The record can be a compilation of various documents. The operating record shall include, but shall not be limited to, the information listed below:

a. The following records shall be maintained until closure is complete and certified:

   i. A current map showing the location of hazardous waste management units and non-regulated units within the facility;

   ii. A map showing all locations of past hazardous waste management units if different from present locations;

   iii. Pursuant to 40 CFR §264.73(b)(1), a description and the quantity of each hazardous waste received, and the method(s) and date(s) of its treatment, storage, or disposal at the facility;

   iv. All submittals prepared pursuant to Permit Condition I.D.13 (revised or supplemental permit application materials);

   v. Certifications as required by 40 CFR §264.196(f) (Leaks or spills from leaking or unfit-for-use tank systems);

   vi. The notice and certification required by a generator under 40 CFR §268.7 (Land Disposal Restrictions) pursuant to 40 CFR §264.73(b)(10);

   vii. Training records of current facility personnel pursuant to 40 CFR §264.16(e);

   viii. Records of spills and releases required by existing environmental laws, including, but not limited to Section 103 of the Comprehensive Environmental Response, Compensation and Liability Act; and

   ix. Written reports and records of verbal notification to the Director and the Administrator to address releases, fires, and explosions.

b. The following records shall be maintained for a minimum of 5 years. This time period may be extended by the Department in the event of enforcement action or notification by the Department that an investigation is ongoing.

   i. Facility operation and maintenance records and reports prepared pursuant to this Permit;

   ii. Monitoring, testing, or analytical data, where required by 40 CFR §264.347 (monitoring and inspections for incinerators).

c. The following records shall be maintained for a minimum of 3 years. This time period may be extended by the Department in the event of enforcement action or notification by the Department that an investigation is ongoing.

i. Generator biennial reports submitted in compliance with 40 CFR §262.41;

ii. Facility biennial reports submitted in compliance with 40 CFR §264.75;

iii. All reports of noncompliance pursuant to Permit Condition I.D.12;

iv. All reports prepared pursuant to Permit Condition I.D.11;

v. Progress reports and any required notifications prepared pursuant to this Permit;

vi. Summary reports and details of any incident that requires implementation of the Contingency Plan, including copies of all reports prepared pursuant to 40 CFR §264.56(i) and Permit Condition II.I.5. or I.D.11.c.;

vii. Certifications pursuant to 40 CFR §264.73(b)(9) (Waste Reduction Plan);

viii. Training records of former facility personnel pursuant to 40 CFR §264.16(e);

x. Records and results of waste analyses required by 40 CFR §264.13, pursuant to 40 CFR §264.73(b)(3), which shall include at a minimum:

A. The date(s), exact place, and times of sampling or measurements;

B. The name of the individual(s) who performed the sampling or measurements;

C. The date(s) analyses were performed;

D. The name of the individual(s) who performed the analyses;

E. The analytical techniques or method used;

F. The analytical results; and

G. The QA/QC summary.

xi. All waste determinations and waste profile determinations made pursuant to the Waste Analysis Plan, Attachment II.B and II.Ba, as applicable, and, records of all monitoring information pursuant to Permit Condition I.E.3; and;

xii. Records of all inspections, pursuant to 40 CFR §264.15(d), which shall include at a minimum:

A. The date and time of the inspection;

B. The name of the person performing the inspection;

C. A notation of the observations made; and

D. The date and nature of any repairs or remedial actions.

d. Current copies of the following documents as amended, revised, and modified shall be maintained at the facility for each permitted hazardous waste management facility until closure and corrective action are complete and certified:

i. Contingency Plan;

ii. Personnel Training;

iii. Waste Analysis Plan;

iv. Documentation of arrangements made with local authorities pursuant to 40 CFR §264.37;

v. Closure Plan;

vi. Plans pertaining to the storage and treatment of reactive waste in tanks required pursuant to 40 CFR §264.17(c) and Permit Condition IV.C.1. (see Module IV);

vii. For all new and converted "new" tank systems, pursuant to 40 CFR §264.192:

A. An assessment, by an independent, registered professional engineer or independent qualified tank installation inspector not affiliated with the tank vendor, certified by an independent, registered professional engineer, that the tank system was installed properly and that all discrepancies have been repaired;

B. Results of tightness testing and integrity assessments; and

C. For all tanks which require corrosion protection, a written statement from a corrosion expert that attests to the proper design and installation of any corrosion protection measures.

viii. Monitoring plans for equipment leaks as required by 40 CFR §264.1064, Air Emission Standards for Equipment Leaks (see Module III, Attachment III.Aa); and

ix. Monitoring plans or information on monitoring exemptions as required by 40 CFR §264.1089, Air Emission Standards for Tanks, Surface Impoundments, and Containers.

x. List of the exact locations of all central accumulation areas at the facility. The Permittee shall notify the Director of new central accumulation areas in accordance with 9 VAC 20-60-262.B.4.

II.K. CLOSURE

II.K.1. Performance Standard

The Permittee shall close the permitted treatment and storage areas as required by 40 CFR §264.111, and in accordance with the Closure Plan, Attachment II.F and II.Fa, as applicable.

II.K.2. Amendments to Closure Plan

The Permittee shall amend the Closure Plan in accordance with 40 CFR §264.112(c) whenever necessary.

II.K.3. Notification of Closure

The Permittee shall notify the Director at least 45 days prior to the date they expect to begin closure as required by 40 CFR §264.112(d).

II.K.4. Time Allowed for Closure

After receiving the final volume of hazardous waste, the Permittee shall treat or remove from the permitted treatment and storage areas being closed all hazardous waste and shall complete closure activities in accordance with 40 CFR § 264.113

and the schedules specified in the Closure Plan, Attachment II.F and II.Fa, as applicable.

II.K.5. Disposal or Decontamination of Equipment

The Permittee shall decontaminate and/or dispose of all facility equipment as required by 40 CFR §264.114 and the Closure Plan, Attachment II.F and II.Fa, as applicable.

II.K.6. Certification of Closure

The Permittee shall certify that the permitted treatment and storage areas have been closed in accordance with the specifications in the closure plan as required by 40 CFR §264.115.

II.L. AIR EMISSION STANDARDS FOR PROCESS VENTS, EQUIPMENT LEAKS, TANKS, AND CONTAINERS

II.L.1. The Permittee shall comply with air emission standards pursuant to 40 CFR Part 264, Subpart AA, Air Emission Standards for Process Vents, Subpart BB, Air Emission Standards for Equipment Leaks, Subpart CC, Air Emission Standards for Tanks and Containers, to the extent applicable.

These air emission standards apply to all non-exempt process vents and control devices, valves, pumps, compressors, pressure relief devices, sampling connection systems, open-ended valves/lines, flanges, and organic air emission control devices and systems, tanks, and containers which contain or contact hazardous wastes with organic concentrations of ten (10) percent (by weight) or greater, and where those wastes are managed in hazardous waste treatment, storage, disposal, or recycling units. These emission standards shall include, but are not be limited to, compliance with the applicable design, installation, operation and maintenance, monitoring and testing, recordkeeping, and reporting requirements of 40 CFR Part 264, Subparts AA, BB, and CC.

II.L.2. The Permittee shall respond to equipment malfunction or failure and each detected leak from equipment, tanks, containers, process vents and control devices, valves, pumps, compressors, pressure relief devices, sampling connection systems, open-ended valves/lines, flanges or other connection device, and organic air emission control devices and systems, which contain or contact hazardous wastes with organic concentrations of ten (10) percent (by weight), as soon as practicable and in accordance with the applicable requirements of 40 CFR Part 264, Subparts AA, BB, and CC, as applicable.

These air emission standards apply to all non-exempt process vents and control devices, valves, pumps, compressors, pressure relief devices, sampling connection systems, open-ended valves/lines, flanges, and organic air emission control devices and systems, tanks, and containers which contain or contact hazardous wastes with organic concentrations of ten (10) percent (by weight) or greater, and where those wastes are managed in hazardous waste treatment, storage, disposal, or recycling units. These emission standards shall include, but are not be limited to, compliance with the applicable design, installation, operation and maintenance, monitoring and testing, recordkeeping, and reporting requirements of 40 CFR Part 264, Subparts AA, BB, and CC.

a. The Permittee shall comply with these emission standards in accordance with:

    i. The applicable design plans and specifications included in Attachments IV.Aa, IV.Ba and IV.Ca;

    ii. The applicable operation and maintenance requirements specified in Attachment IV.Ba, Storage and Treatment Operations;

    iii. The Leak Detection and Repair Inspection and Monitoring Plan developed to comply with the applicable requirements of 40 CFR 264, Subpart BB Air Emissions Standards for Equipment Leaks, in Attachment III.Aa; and

    iv. The Inspection and Monitoring Plan developed to comply with the applicable requirements of 40 CFR 264, Subpart CC, Air Emission Standards for Tanks and Containers, in Attachment III.Ba.

b. The Inspection and Monitoring Plans for Subparts BB and CC (provided in Attachment III.Aa and III.Ba, respectively) contain figures and tables which depict and list the equipment, tanks, containers, valves, pumps, compressors, pressure relief devices, sampling connection systems, open-ended valves/lines, flanges or other connection devices, and organic air emission control devices and systems, which are required to be inspected, monitored, and maintained in accordance with 40 CFR Part 264, Subparts AA, BB, and CC, as applicable.

c. The Permittee shall respond to equipment malfunction or failure and each detected leak from equipment, tanks, containers, process vents and control devices, valves, pumps, compressors, pressure relief devices, sampling connection systems, open-ended valves/lines, flanges or other connection device, and organic air emission control devices and systems, which contain or contact hazardous wastes with organic concentrations of ten (10) percent (by weight), as soon as practicable and in accordance with the applicable requirements of 40 CFR Part 264, Subparts AA, BB, and CC, as applicable.

d. The Permittee shall comply with the applicable reporting requirements of 40 CFR Part 264, Subparts AA, BB, and CC, and in accordance with the

Inspection and Monitoring Plans specified in Attachments III.Aa and III.Ba. All required reports shall be signed and dated by an authorized representative of the Permittee in accordance with the VHWMR and Permit Condition I.I.3.

i. Semi-annual reports shall be submitted to the Department, as applicable, on March 31 and September 30 of each year.

ii. For compliance with 40 CFR Part 264, Subpart BB, as applicable, the semiannual written report to the Department is to be in accordance with requirements of § 264.1065 except as provided in § 264.1065(d).

iii. For compliance with 40 CFR Part 264, Subpart CC, as applicable, the semiannual written report to the Department is to be in accordance with the following:

A. Reporting requirements of § 264.1090(c) except as provided in § 264.1090(d).

B. In addition, the facility shall also report all instances whenever a non-compliance event exceeds or operates outside of the design specifications as defined in § 264.1035(c)(4)(iii) and such exceedances were not corrected within 24 hours. The report shall describe each occurrence during the previous 6-month period when a control device is operated continuously for 24 hours or longer in noncompliance with the applicable operating values defined in § 264.1035(c)(4)(iii) and when a flare was operated with visible emissions for five (5) minutes or longer within a two-hour period as defined in § 264.1033(d), as applicable.

II.L.3. Prior to installing any tank, surface impoundment, container, or miscellaneous unit subject to 40 CFR 264, Subpart CC, the Permittee shall apply for a permit modification in accordance with Permit Condition I.B.2. and provide specific Part B information required under 40 CFR §§ 270.24, 270.25, and 270.27, as applicable.

MODULE II – LIST OF ATTACHMENTS

The following Attachments are incorporated, in their entirety, by reference into this Permit. These incorporated attachments are enforceable conditions of this Permit. Some of the documents contain excerpts from the Permittee's Hazardous Waste Permit Application. The Department has, as deemed necessary, modified specific language excerpted from the permit application. Additional modifications are prescribed in the Permit Conditions (Modules I through V), and thereby supersede the language of the attachments. Operations of the hazardous waste management units covered herein shall be in accordance with the contents of the Attachments and this Permit.

Attachment II.A – Facility Description

Attachment II.Aa – Facility Description for the EWI-CWP Complex

Attachment II.B – Waste Analysis Plan

Attachment II.Ba – Waste Analysis Plan for the EWI-CWP Complex

Attachment II.C – Inspection Schedule

Attachment II.Ca – Inspection Schedule for the EWI-CWP Complex

Attachment II.D – Personnel Training

Attachment II.Da – Personnel Training for the EWI-CWP Complex

Attachment II.E – Contingency Plan

Attachment II.Ea – Contingency Plan for the EWI-CWP Complex

Attachment II.F – Closure Plan

Attachment II.Fa – Closure Plan for the EWI-CWP Complex

Attachment II.G – Security Provisions

Attachment II.Ga – Security Provisions for the EWI-CWP Complex

Attachment II.H – Flood Proofing/Protection Plan

Attachment II.Ha – Flood Proofing/Protection Plan for the EWI-CWP Complex

Attachment II.A - Facility Description

II.A.1. Facility

The Radford Army Ammunition Plant (RFAAP) encompasses approximately 4,104 acres of land and is located in southwest Virginia in Pulaski and Montgomery Counties as shown on Figure II.A-1. The RFAAP is located approximately 4 miles north of the city of Radford, 7 miles southwest of Blacksburg, 9 miles northwest of Christiansburg, and 30 miles southwest of Roanoke. The New River separates Pulaski and Montgomery Counties and also divides the RFAAP into two (2) portions commonly known as the Horseshoe Area and the Main Manufacturing Area. These areas, and the approximate outline of the RFAAP boundary, are shown on the topographic map in Figure II.A-2.

For the purposes of this Permit, the facility consists of all contiguous portions of the RFAAP owned by the United States Army (US Army). The facility specifically includes both the Horseshoe Area and the Main Manufacturing Area.

II.A.2. Permitted Treatment and Storage Area

Pursuant to 40 CFR 270.1(c)(4), this Permit is effective for only a portion of the facility. The “permitted treatment and storage area” is located in the north central portion of the Horseshoe Area of the facility. Figures II.A-2 and II.A-3 provide the topographic characteristics of the area, demonstrate the facility boundary, and specify the location of each of the permitted units and surrounding structures. Figure II.A-4 depicts the land use within 1,000 feet of the RFAAP property line. Figure II.A-5 depicts the 100-year flood elevation as it relates to the “permitted treatment and storage area.” Flood Proofing/Protection Plans and Specifications and 100-year Flood Response Procedures are in Attachment II.H of Module II. Figure II.A-6 provides a diagram of the traffic pattern around the incinerator area, including, traffic control, signs and procedures for expected traffic on-site.

Included in the “permitted treatment and storage area” are the locations of all grinding, tank storage and treatment, and incinerator operations associated with the incineration of hazardous waste at the facility. Also included in the area are all control and ancillary operations associated with the grinder, tank, and incinerator units. The following buildings and structures are specifically included within the “permitted treatment and storage area”:

- The Grinder Building (identified as Building/Account No. 442), where wastes are accumulated and ground into small pieces prior to being mixed into the slurry and incinerated. The Grinder Building houses the two permitted storage tanks;

- Incinerators 440 and 441 (identified as Accounts 440 and 441); where the slurried wastes are treated in accordance with this Permit, the applicable RCRA requirements, and the requirements of the Hazardous Waste Combustor National Emission Standards for Hazardous Air Pollutants;

- Control House, identified as Building 447;

- Incinerator Buildings, accounts 440 and 441: and

- Ancillary Buildings, accounts A-440, B-440, and A-441.

The following areas are specifically excluded from the "permitted treatment and storage area" (refer to Figure II.A-3 for structure designations) as these are included in the RCRA Corrective Action Permit issued by DEQ or were closed under previous closure plans administered by the DEQ:

- Settling Ponds #1 and #2 (identified as Accounts 445 and 446), which were designated as Solid Waste Management Unit (SWMU) No. 39 and were previously clean closed under the USEPA RCRA Corrective Action Permit;

- Incinerator Fuel Oil Storage Units, including Structures 432 and 443, which were underground storage tanks used for fuel oil storage and were previously closed under a plan administered by the DEQ;

- Spray Pond (identified as Account 444), which was identified as Hazardous Waste Management Unit (HWMU) No. 39 and was previously closed under a plan administered by the DEQ; and

- Ancillary Building A-444, which served as the pump house for the spray pond and was previously closed under a plan administered by the DEQ.

In addition to these areas, there are several other structures in the general vicinity of the incinerators that are not included in the permitted storage and treatment area because they are not used to storage hazardous waste or do not accumulate waste for periods greater than 90 days. These buildings and structures include:

- The incinerator supply storage building (identified as Building 431);

- Temporary waste accumulation area (identified as Building 430), which is used to accumulate wastes for < 90 day periods prior to treatment in the incinerator; and

- Ancillary buildings in the incinerator complex that store supplies and/or instrument equipment and calibration gases (identified as Accounts A-440, B-440, and A-441).

II.A.3. Land Use Analysis

Figure II.A-4 provides a map of the land use within 1,000 feet of the property boundary. The land use surrounding the permitted treatment and storage areas is largely rural, with a large portion of the area being covered in deciduous forest especially the area located east and south of the facility. Subtracting out those developed areas occupied by the RFAAP property, the next highest percentage of land use is represented as pasture or hay regions. The majority of the cropland is located to the west and southwest of the facility.

The majority of development exists to the southeast of the main gate, along Peppers Ferry Road, and across the river opposite the Horseshoe Area northwest of the plant. Nearby towns include:

- Radford, which is approximately 4 miles south of the RFAAP;
- Christiansburg, which is approximately 9 miles southeast of the RFAAP; and
- Blacksburg, which is located approximately 7 miles to the northeast.

The nearest schools to the facility boundary include Belview Elementary School, Riverlawn Elementary School, and Prices Fork Elementary School, all of which are at least a mile from the permitted storage and treatment area.

Figure II.A-1 – General Location Map of the Radford Army Ammunition Plant

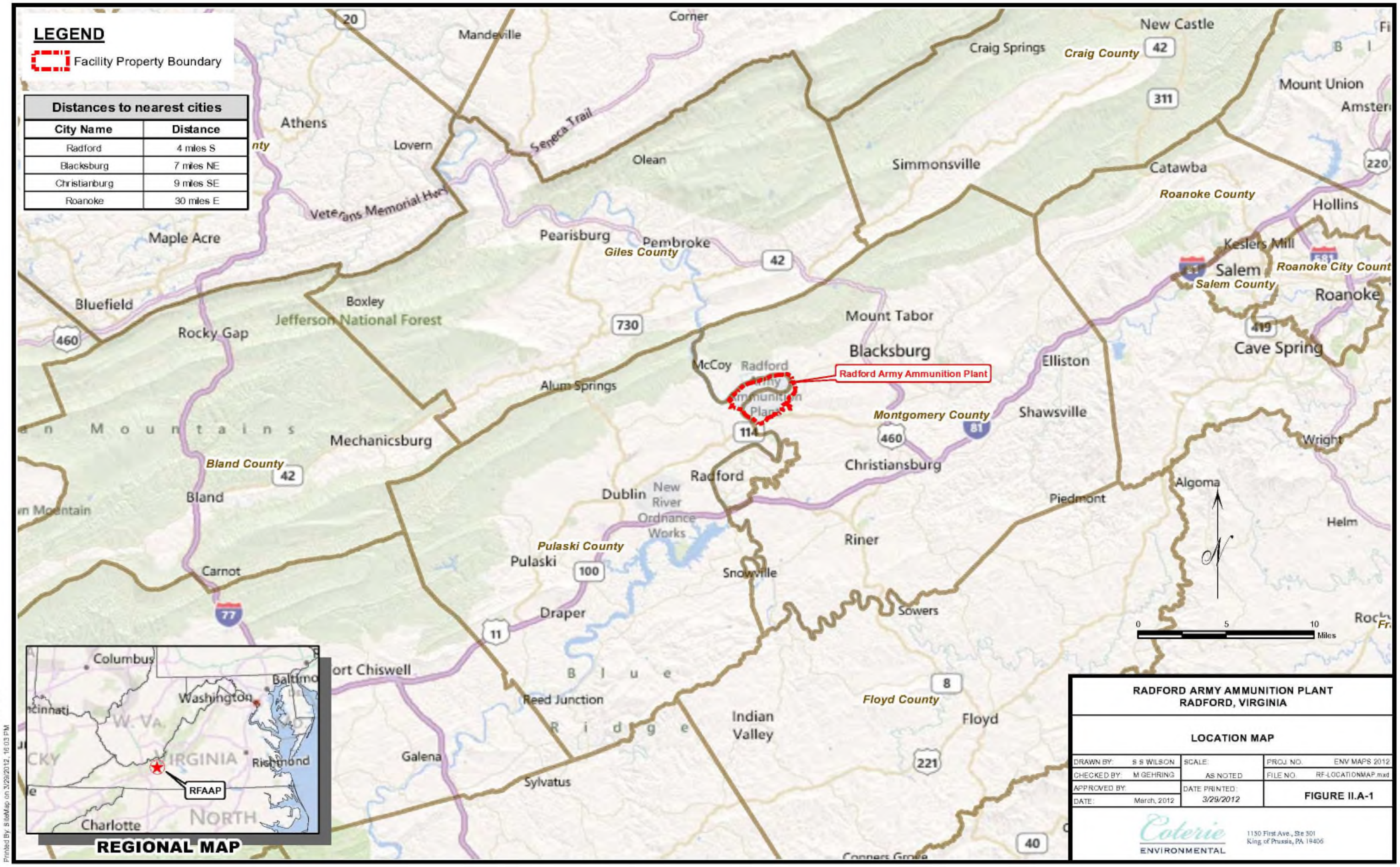


Figure II.A-2 – Topographic Map of the Radford Army Ammunition Plant

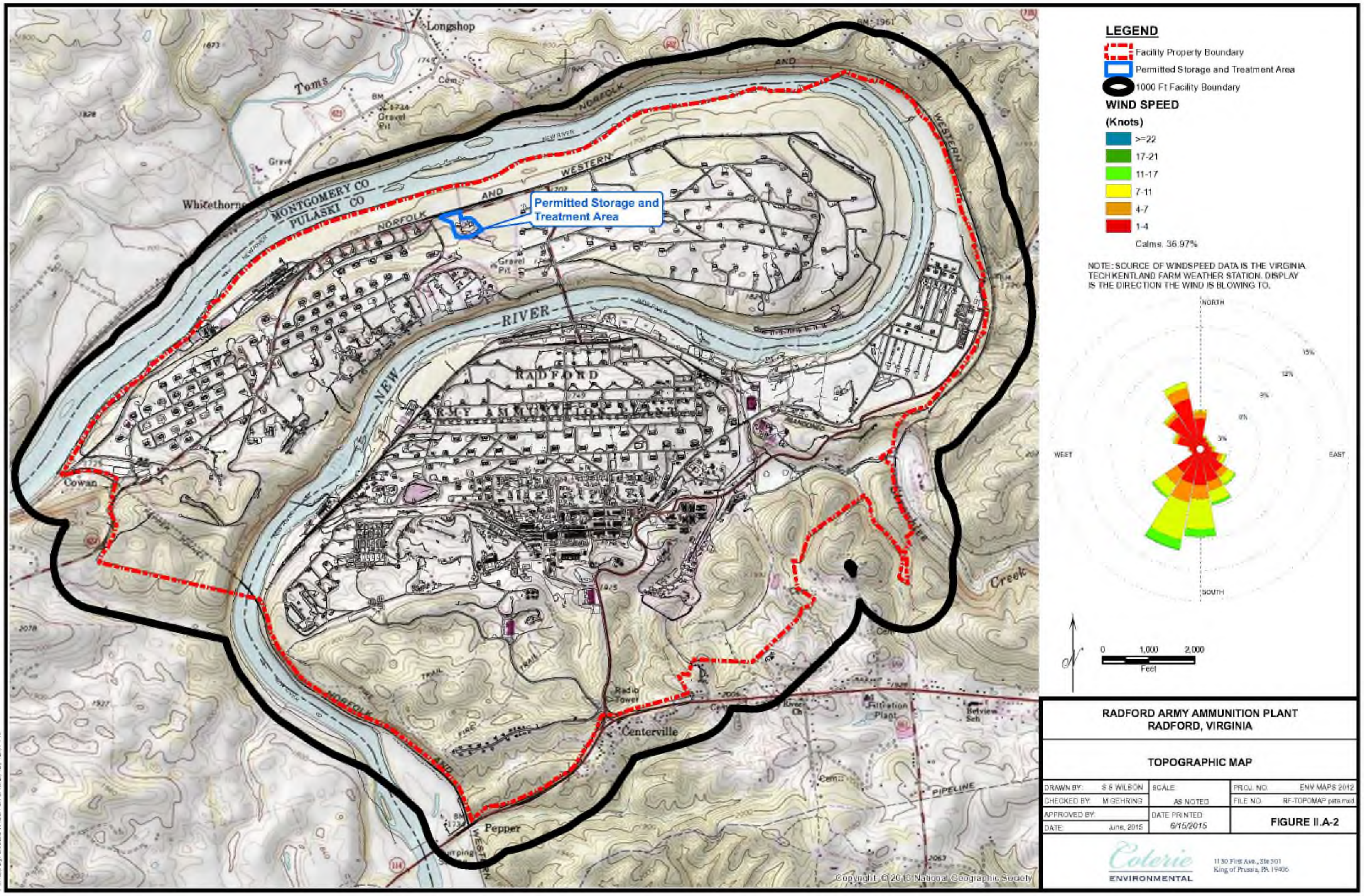


Figure II.A-3 – Topographic Map of the Permitted Storage and Treatment Areas

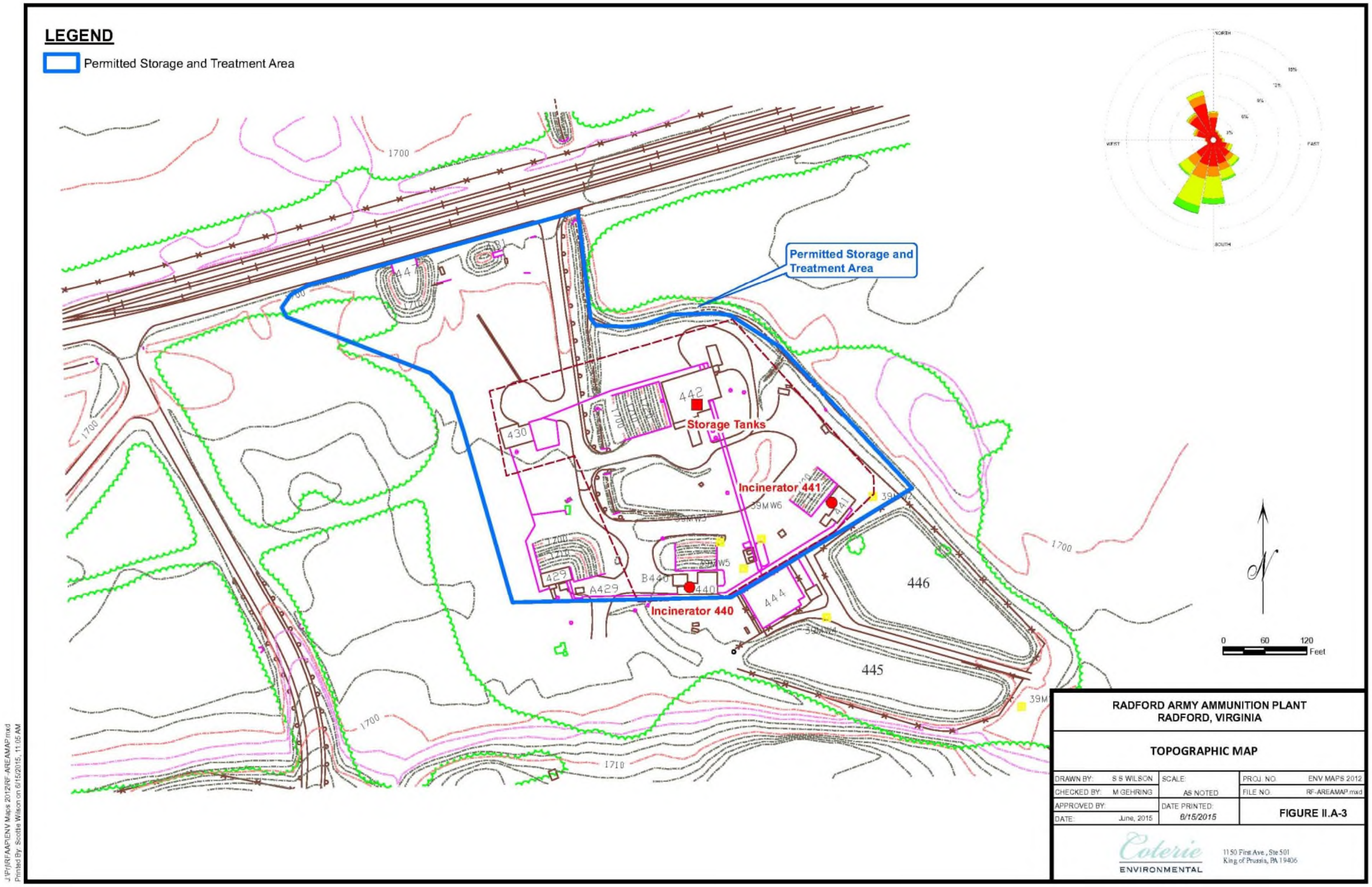


Figure II.A-4 – Land Use and Land Cover Characteristics

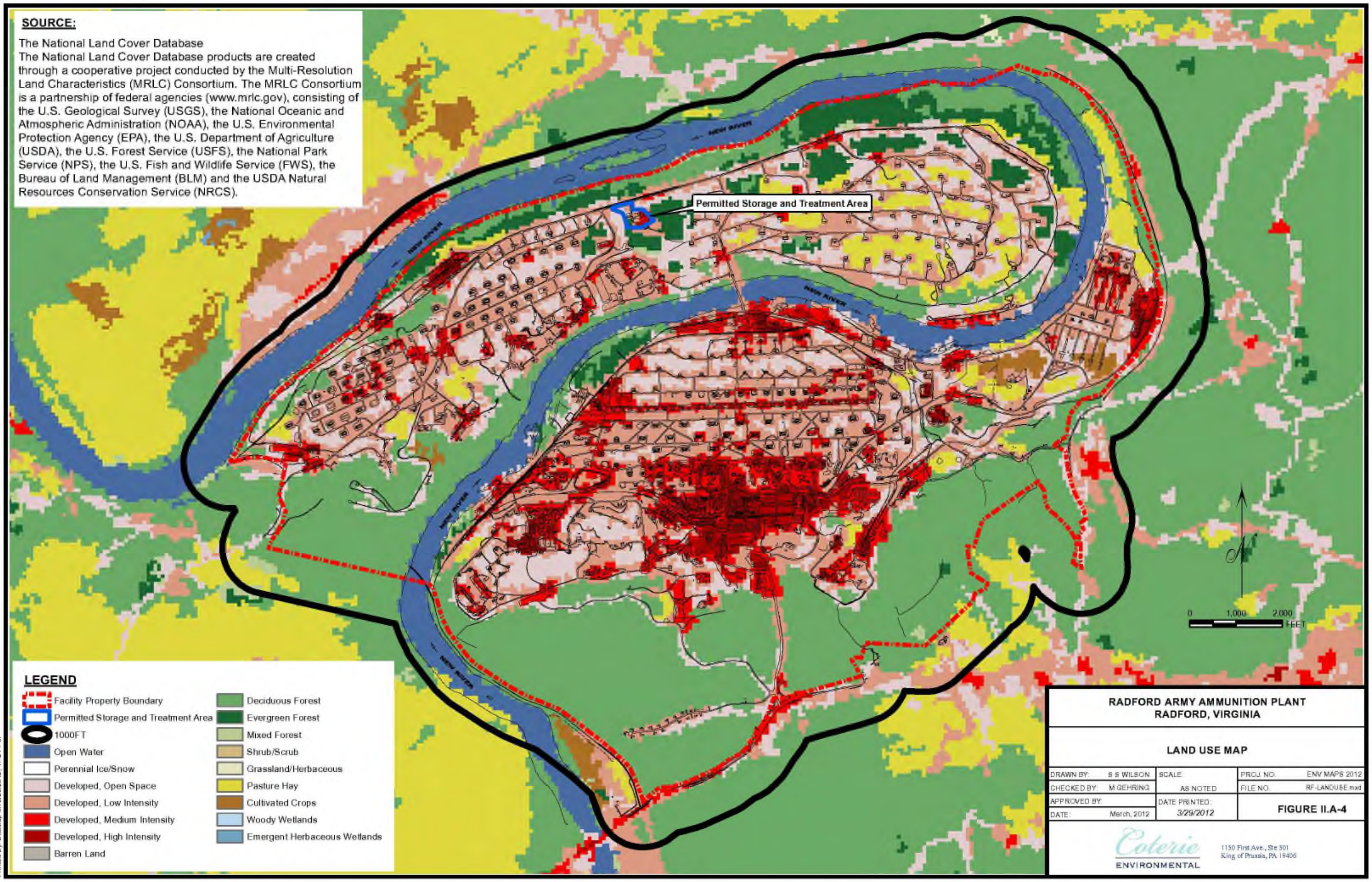


Figure II.A-5 – Flood Map

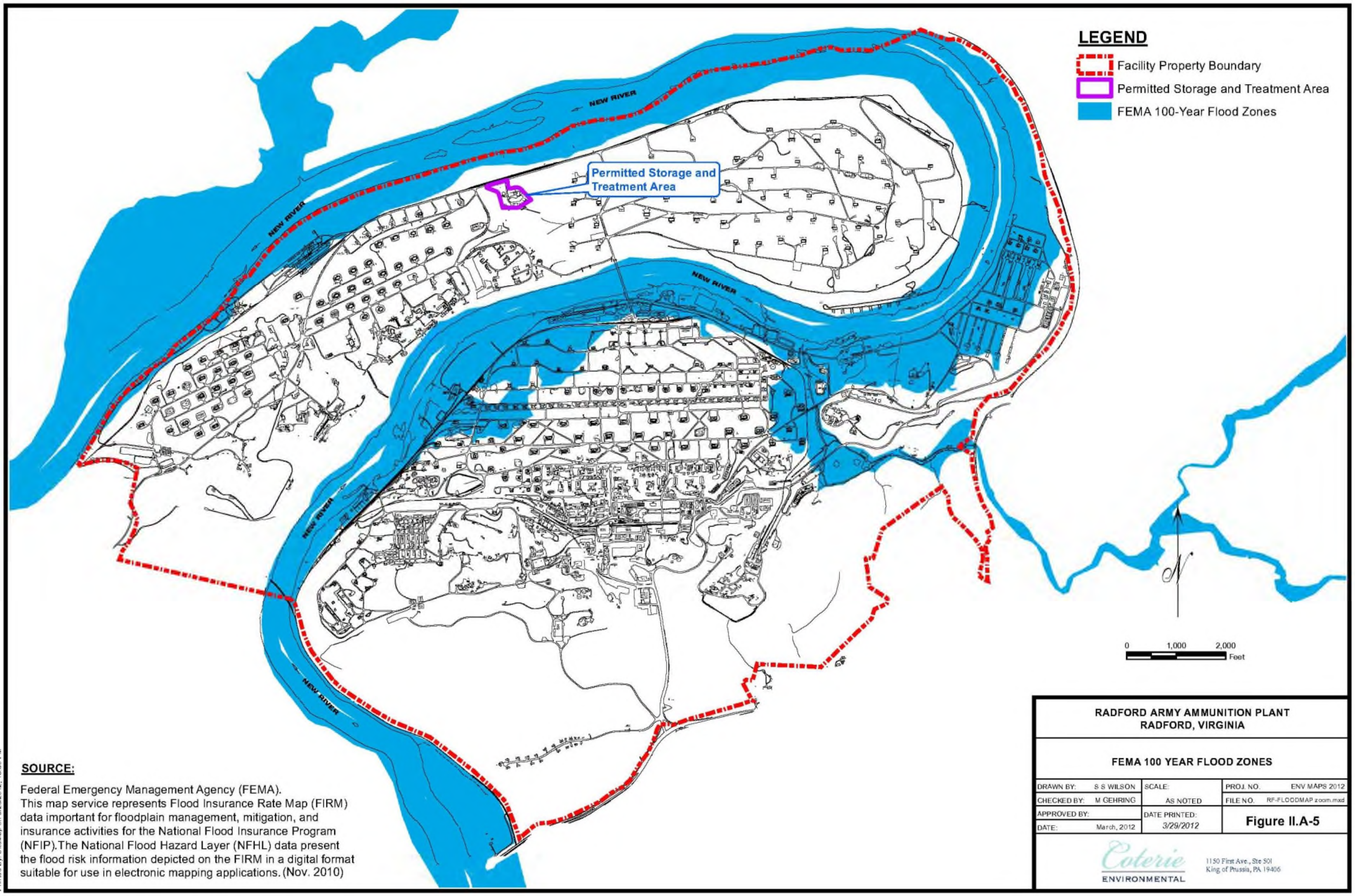
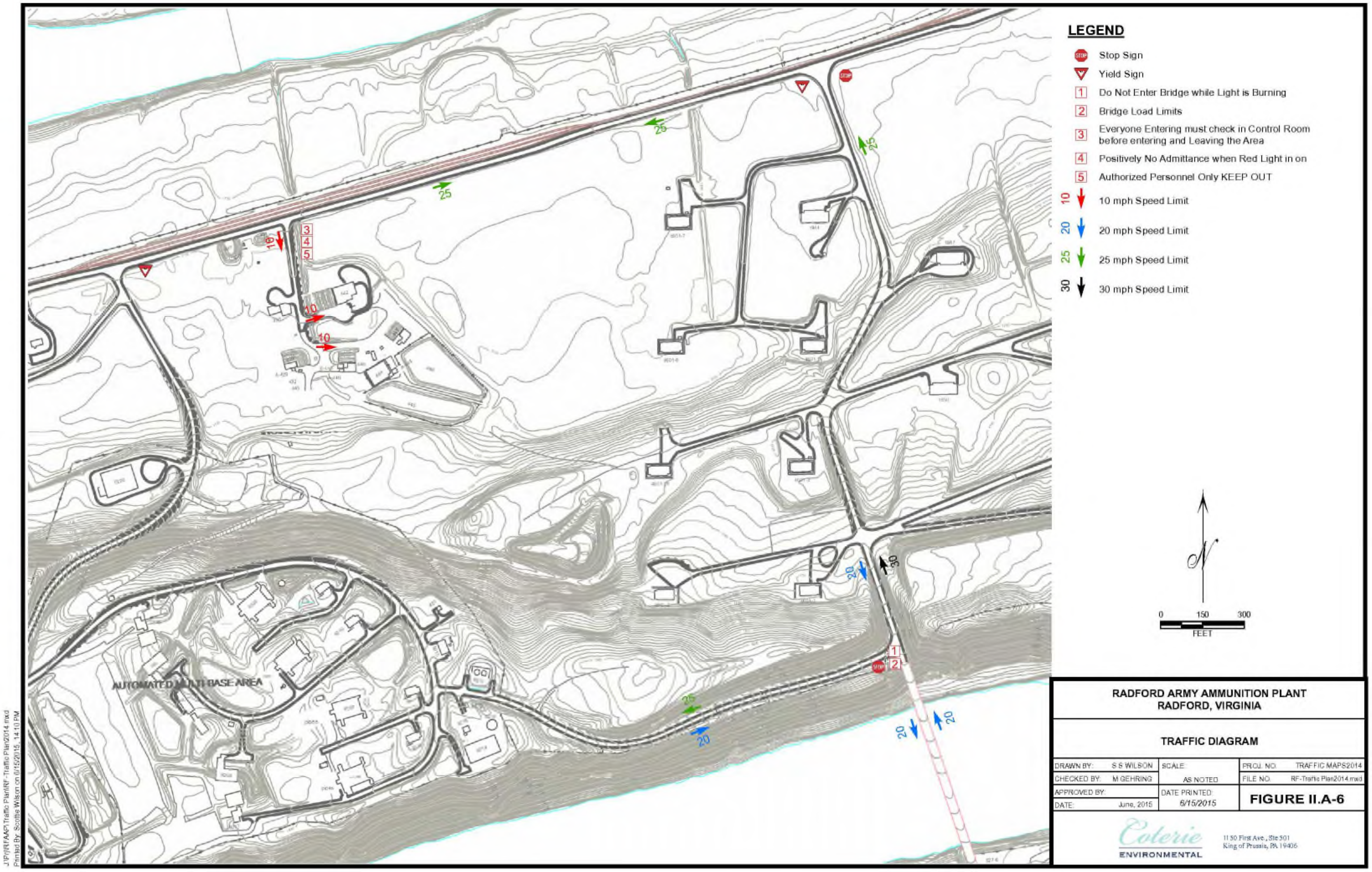


Figure II.A-6 – Traffic Diagram



Attachment II.Aa - Facility Description for the EWI-CWP Complex

II.Aa.1. Facility

The Radford Army Ammunition Plant (RFAAP) encompasses approximately 4,104 acres of land and is located in southwest Virginia in Pulaski and Montgomery Counties as shown on Figure II.Aa-1. The RFAAP is located approximately 4 miles north of the city of Radford, 7 miles southwest of Blacksburg, 9 miles northwest of Christiansburg, and 30 miles southwest of Roanoke. The New River separates Pulaski and Montgomery Counties and also divides the RFAAP into two (2) portions commonly known as the Horseshoe Area and the Main Manufacturing Area. These areas, and the approximate outline of the RFAAP boundary, are shown on the topographic map in Figure II.Aa-2.

For the purposes of this Permit, the facility consists of all contiguous portions of the RFAAP owned by the United States Army (US Army). The facility specifically includes both the Horseshoe Area and the Main Manufacturing Area.

II.Aa.2. Permitted Treatment and Storage Area (EWI-CWP)

Pursuant to 40 CFR §270.1(c)(4), this Permit is effective for only a portion of the facility. The EWI-CWP complex is located in the north central portion of the Horseshoe Area of the facility. Figures II.Aa-2 and II.Aa-3 provide the topographic characteristics of the area, demonstrate the facility boundary, and specify the location of each of the permitted units and surrounding structures.

Figure II.Aa-4 depicts the land use within 1,000 feet of the RFAAP property line. Figure II.Aa-5 depicts the 100-year flood elevation as it relates to the EWI-CWP complex. As shown in the figure and detailed in Attachment II.Ha of Module II, all hazardous waste management locations are outside of the 100-year flood plain. Figure II.Aa-6 provides a diagram of the traffic pattern around the EWI-CWP complex, including traffic control, signs and procedures for expected traffic onsite.

All grinding, tank storage and treatment, and operations associated with the incineration of hazardous waste at the RFAAP are included in the EWI-CWP complex. Also included in the area are all control and ancillary operations associated with the grinder, tank, and thermal treatment units. The following buildings and structures are specifically included within the EWI-CWP complex and are used to either store or treat hazardous wastes:

- The Grinder Building (identified as Building 613), where wastes are transported prior to treatment and are ground into small pieces prior to being mixed into the slurry and incinerated in the rotary kiln incinerators. The Grinder Building houses the permitted hazardous waste storage tanks, including the makeup water tank, the decant water tank, and the three kiln storage tanks, as well as the grinder tanks. The other tanks housed within the Grinder Building (the firewater collection tanks) are not hazardous waste storage or treatment tanks. The Grinder Building also includes a SWECO vibratory separation system that can be used to prepare the wastes for offsite shipment if necessary;

- Rotary Kiln Incinerators 616 and 617, where the slurried wastes are thermally treated in accordance with this Permit, the applicable RCRA requirements, and the requirements of the Hazardous Waste Combustor National Emission Standards for Hazardous Air Pollutants (HWC NESHAP);

- The Contained Burn Chamber (CBC) (Account 615-CBC-50202), where hazardous wastes that cannot be slurried are thermally treated in accordance with this Permit, the applicable RCRA requirements, and the HWC NESHAP; and

- The CBC and Car Bottom Storage/Loading Building (henceforth referred to as the Loading Building and identified as Building 614), where hazardous wastes are brought prior to treatment and are configured into batches for treatment in the CBC and where metal items targeted for decontamination are loaded onto carts for the Car Bottom Oven;

In addition, the following additional accounts are located within the area. These buildings or units do not manage hazardous wastes but are associated with the overall operations of the facility:

- The Car Bottom Oven (Account 615-R-50006), where large pieces of metal, such as production equipment and piping, are decontaminated in accordance with the State of Virginia Air Pollution Control Laws (the treated items are not hazardous wastes);

- The Operations Control Center (OCC) Building, identified as Building 610, where operators direct remote operation of the Grinder Building, the rotary kiln incinerators, the CBC, and the Car Bottom Oven;

- The Maintenance Storage Building, identified as Building 611, where parts and pieces of the thermal treatment systems and ancillary equipment are brought for maintenance; and,

- The Motor Control Center (MCC) Building, identified as Building 612, where all of the programmable logic controllers (PLCs) and controls for the various system components are housed.

II.Aa.3. Land Use Analysis

Figure II.Aa-4 provides a map of the land use within 1,000 feet of the property boundary. The land use surrounding the EWI-CWP complex is largely rural, with a large portion of the area being covered in deciduous forest, especially the area located east and south of the facility. Subtracting out those developed areas occupied by the RFAAP property, the next highest percentage of land use is represented as open water and pasture or hay regions. The majority of the cropland is located to the west and southwest of the facility.

The majority of development exists to the southeast of the main gate, along Peppers Ferry Road, and across the river opposite the Horseshoe Area northwest of the plant. Nearby towns include:

- Radford, which is approximately 4 miles south of the RFAAP;
- Christiansburg, which is approximately 9 miles southeast of the RFAAP; and
- Blacksburg, which is located approximately 7 miles to the northeast.

The nearest schools to the facility boundary include Belview Elementary School, Riverlawn Elementary School, and Prices Fork Elementary School, all of which are at least a mile from the EWI-CWP complex.

Figure II.Aa-1 – General Location Map of the Radford Army Ammunition Plant

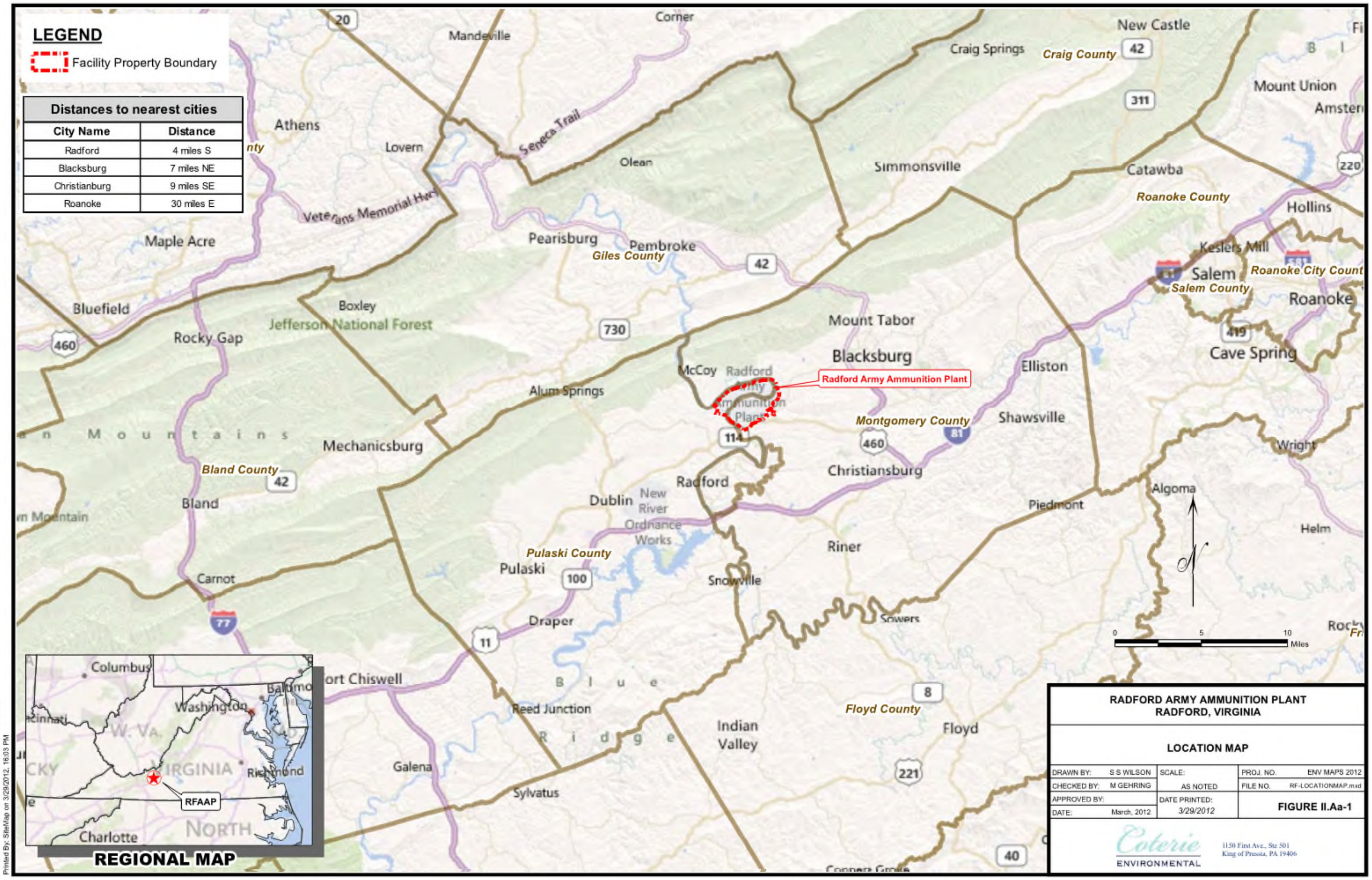


Figure II.Aa-2 – Topographic Map of the Radford Army Ammunition Plant

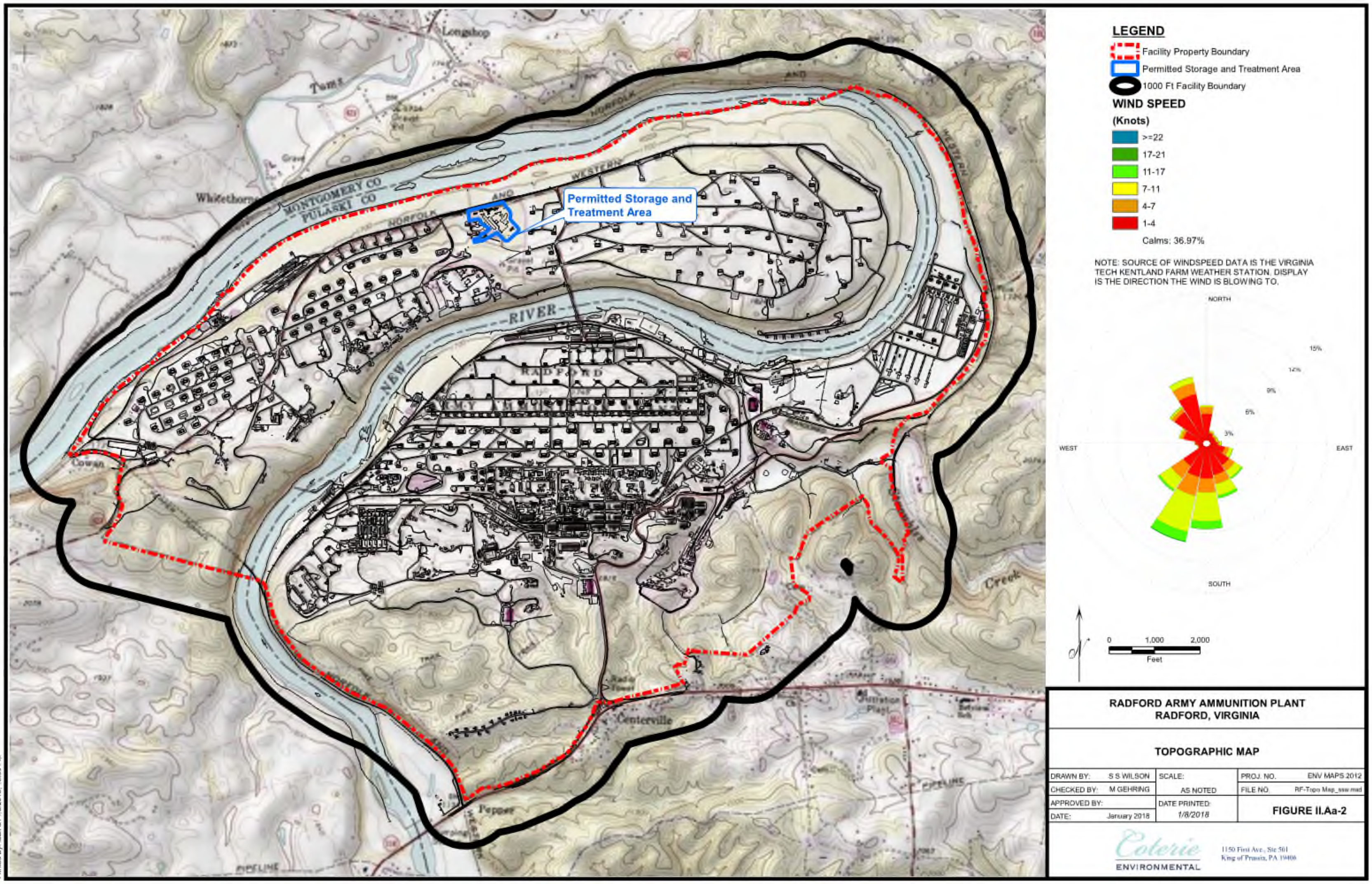


Figure II.Aa-3 – Topographic Map of the EWI-CWP Complex

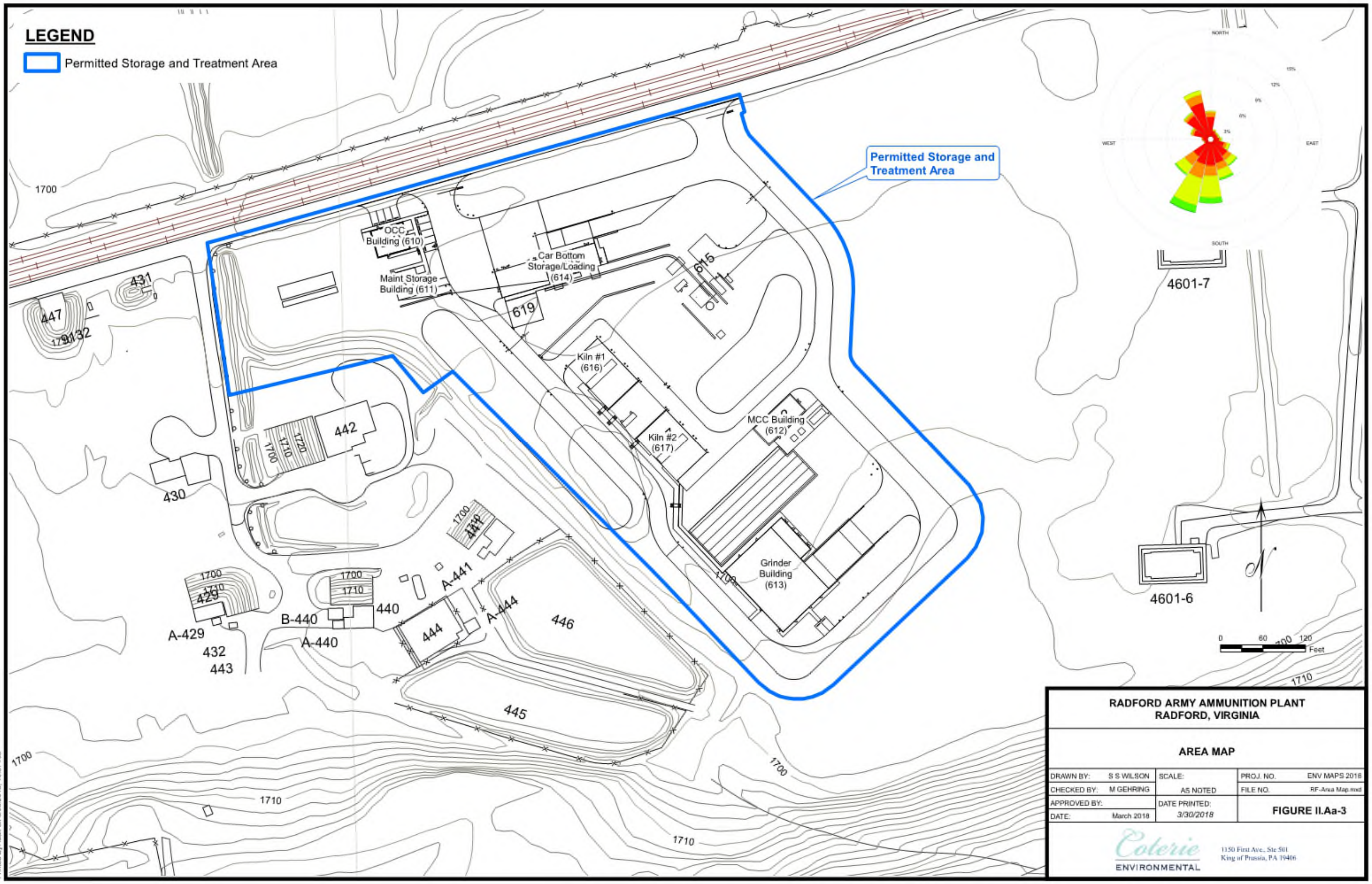


Figure II.Aa-4 – Land Use and Land Cover Characteristics

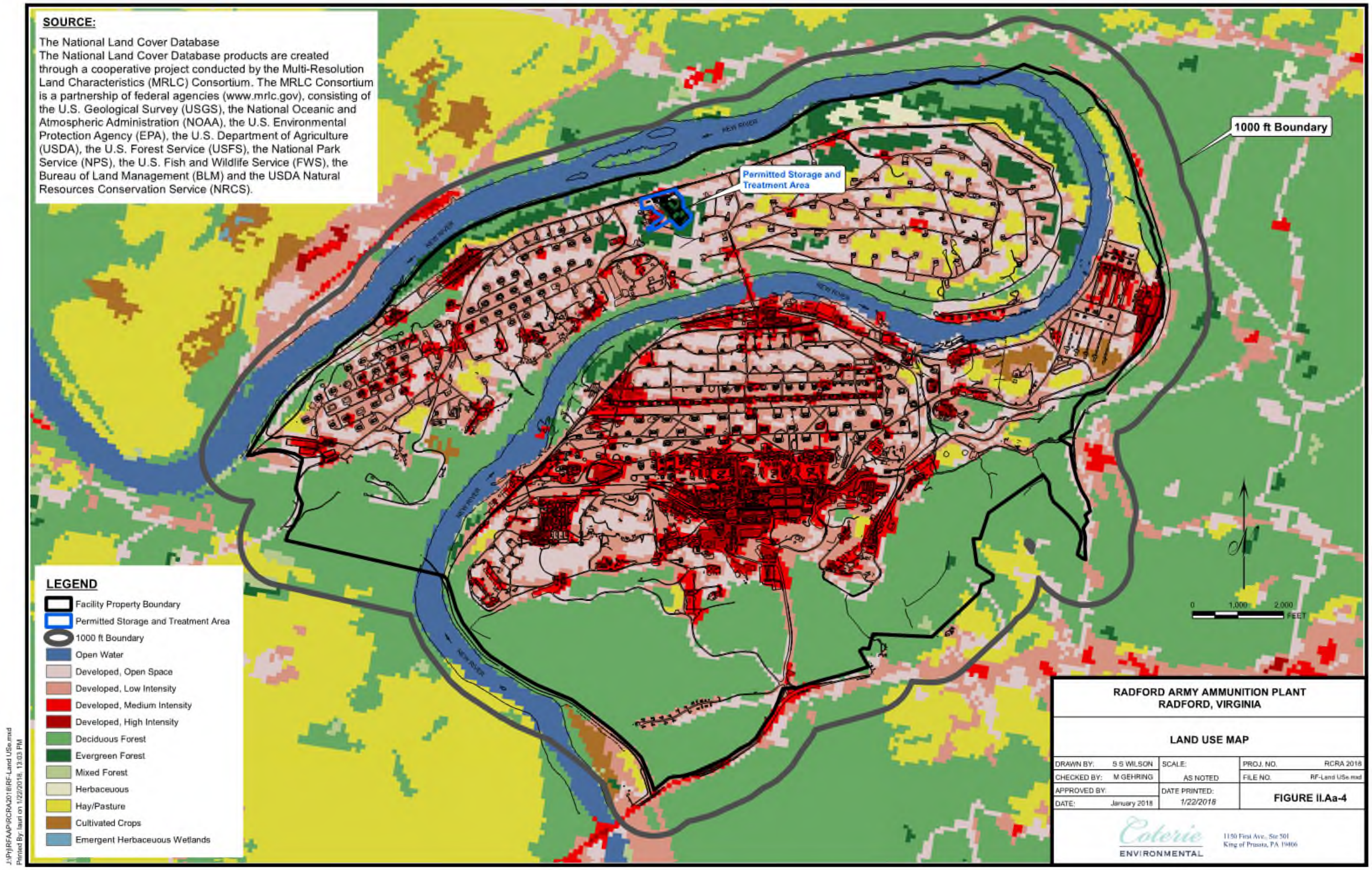


Figure II.Aa-5 – Flood Map

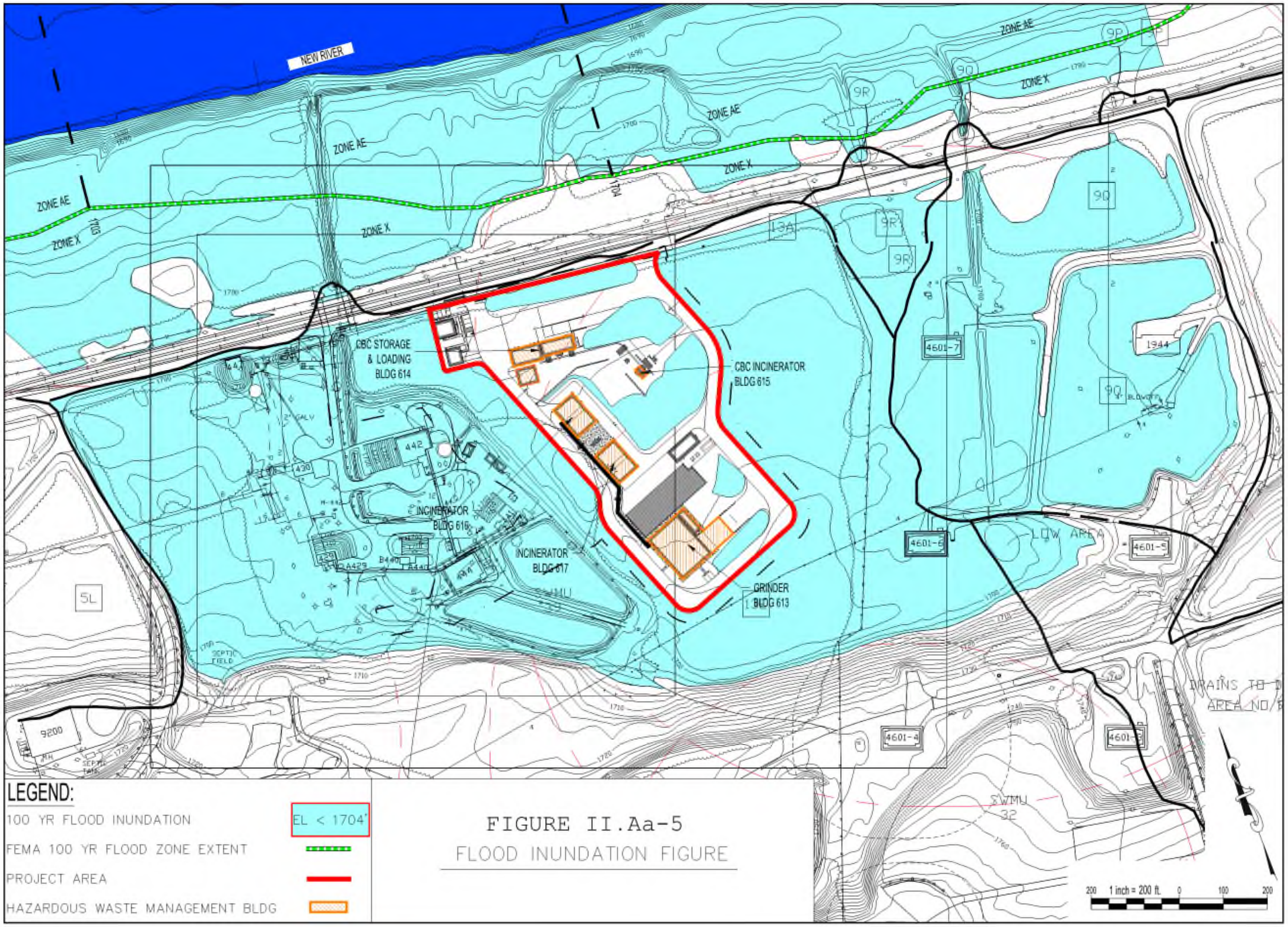
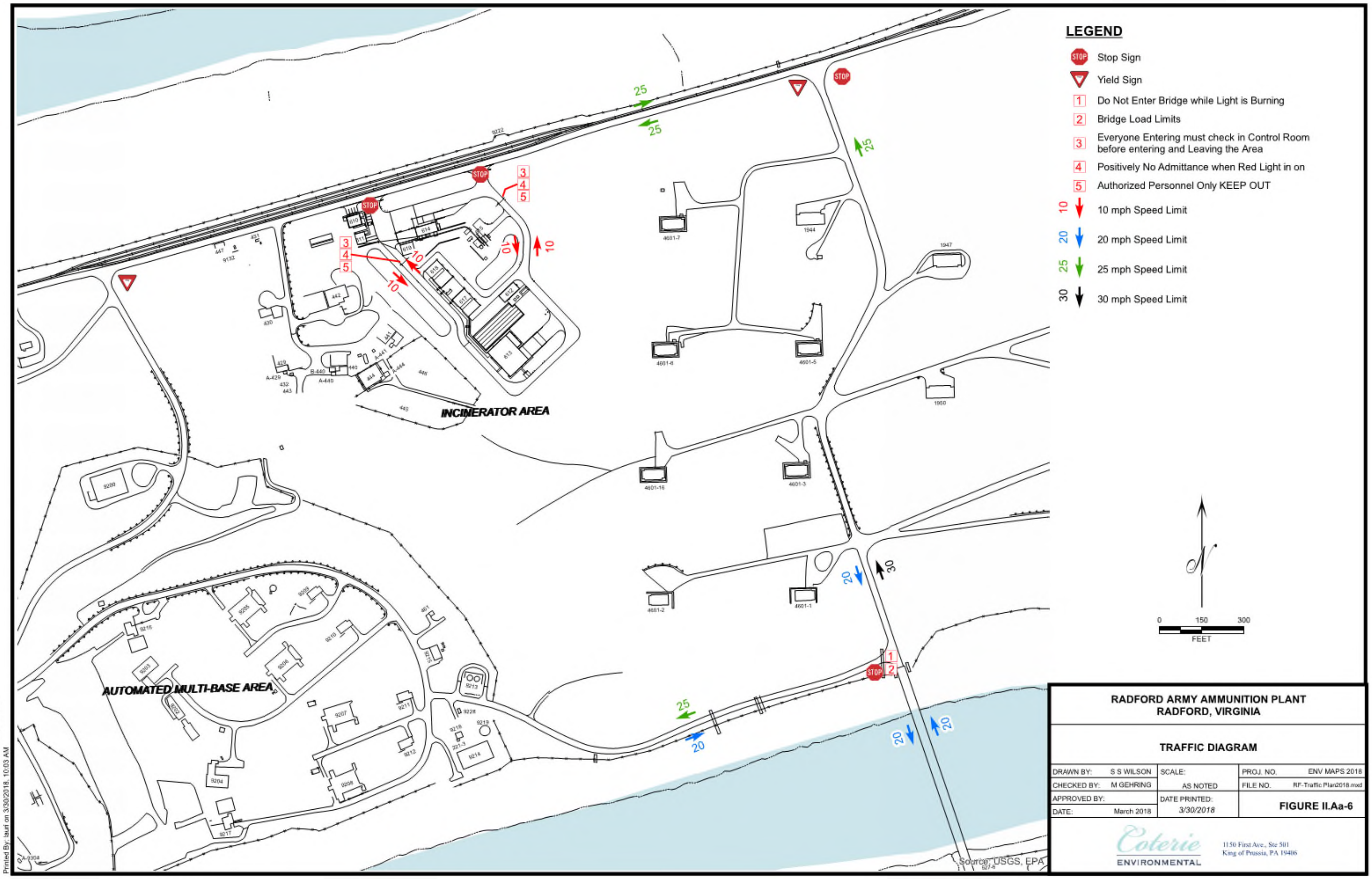


Figure II.Aa-6 – Traffic Diagram



Attachment II.B – Waste Analysis Plan

II.B.1. Waste Characteristics

Those hazardous wastes that may be stored and/or treated at the permitted treatment and storage areas are waste energetic materials and spill "clean-up" residues generated at the Radford Army Ammunition Plant (RFAAP) by either the contracted operator (the Permittee) or one of the RFAAP tenant organizations. No wastes generated outside of the RFAAP will be received, stored, or treated at the permitted storage and treatment area.

The wastes that are stored and treated at the permitted area are hazardous due to their ignitability (D001), reactivity (D003), and/or toxicity for certain metals and organics. Only those hazardous wastes that are within the specifications of the facility's RCRA Permit and this Waste Analysis Plan will be stored and/or treated in the permitted storage and treatment area. Neither radioactive wastes, nor mixed radioactive and hazardous wastes, nor wastes that are listed pursuant in 9 VAC 20-60-261, incorporating 40 CFR 261.31, 32, and 33 by reference, will be stored and/or treated at the permitted treatment and storage areas.

In general, the managed wastes include wastes that exhibit the following hazardous characteristic(s);

i. Reactivity (hazardous waste number D003) as specified in 9 VAC 20-60-261, incorporating 40 CFR 261.23 by reference;

ii. Toxicity, as specified in 9 VAC 20-60-261, incorporating 40 CFR 261.24 by reference, for one or more of the following contaminants:

a) Arsenic (hazardous waste number D004);

b) Barium (hazardous waste number D005);

c) Cadmium (hazardous waste number D006);

d) Chromium (hazardous waste number D007);

e) Lead (hazardous waste number D008);

f) Mercury (hazardous waste number D009);

g) Selenium (hazardous waste number D010);

h) Silver (hazardous waste number D011); and

i) 2,4-Dinitrotoluene (hazardous waste number D030).

iii. Ignitability (hazardous waste number D001) as specified in 9 VAC 20-60-261, incorporating 40 CFR 261.21 by reference.

A specific list of those wastes permitted for storage and treatment in the incinerator area is provided in Table I of Appendix II.B-1. As shown in the table, the wastes are classified into one of 19 different waste groups that are described in detail in Section II.B.2. These group numbers were assigned as the information on the waste groups was collected. There is no significance to the order of the discussion in Section II.B.2 below or the group numbers in Table I of Appendix II.B-1.

II.B.2. Waste Composition and Characterization

The composition of the energetic waste mixtures generated and fed to the incinerators varies due to changes in the production schedule. However, all of the wastes can be categorized into one of the 19 groups of waste identified in Table I of Appendix II.B-1. This table identifies each waste by group number and specifies the RCRA hazardous waste codes that may be applicable to that group. Information on the 40 CFR Part 261 Appendix VIII constituents that may be present in each group is provided in Table II of Appendix II.B-1.

If the Permittee wishes to store or treat waste whose formulation is not consistent with one of the groups identified in Table I of Appendix II.B-1 in the permitted storage and treatment area, the Permittee shall submit a request for permit modification.

II.B.2.a. Off-Specification Propellant and Propellant Production Intermediates

Table I of Appendix II.B-1 identifies nine groups that contain single, double, or triple base propellants and propellant intermediates. These three categories of propellant differ in their primary energetic constituents as follows:

- Single base propellants contain nitrocellulose;
- Double base propellants contain two energetics, typically nitrocellulose and nitroglycerin; and
- Triple base propellants contain three energetics, typically nitrocellulose, nitroglycerin, and nitroguanidine.

These nine groups have been divided based on the primary propellant category and other waste constituents that distinguish them from each other. The nine groups are as shown in Table I in Attachment II.B, Appendix II.B-1.

II.B.2.b. Liquid Wastes with Glycol

The waste streams containing diethylene glycol (DEG) and triethylene glycol (TEG) are generated from the washing of nitroglycerin (NG) and diethylene glycol dinitrate (DEGDN) with water to remove the desensitizing agents DEG and TEG from the NG and DEGDN. These waste streams are non-hazardous. They contain water (80-85%) and glycol (15-20%) and may be used in the production of slurry batches for incineration in Tanks T-1A and T-1B. The waste groups for these streams are identified in Table I of Appendix II.B-1 as Group 5 (TEG Water) and Group 6 (DEG Water).

II.B.2.c. Load, Assemble, and Pack Waste

The load, assemble, and pack waste consists of energetic wastes generated when ammunition cartridges are assembled. The waste consists of materials that are placed in the cartridges such as HMX, RDX, and propellants. These wastes are identified in Appendix II.B-1 Table I as Group 15.

The finished products from the load, assemble, and pack operations, including the off-specification projectiles that contain energetic materials, cases with primers, and primers shall not be treated or stored at the permitted tanks and incinerators.

II.B.2.d. Specialty Products Waste

The specialty products waste groups (17, 18, and 19) contain energetic materials such as nitrocellulose, nitrate esters, nitroguanidine, solid explosives, and 40 CFR 261, Appendix VIII constituents, and are generated in small quantities. The specialty products wastes identified as Group 18 on Table I of Appendix II.B-1 also contain chlorides or perchlorates. The specialty products wastes identified as Group 19 on Table I of Appendix II.B-1 contain metals in addition to the other materials contained in specialty product wastes.

II.B.2.e. Miscellaneous Wastes

The miscellaneous wastes listed in Table I of Appendix II.B-1 include:

a) Ignitable and reactive liquids in sawdust;

b) Propellant laboratory waste;

c) Waste nitrocellulose; and

d) Dinitrotoluene and trinitrotoluene wastes from manufacturing that are not listed wastes.

The term ignitable and reactive liquids in sawdust refers to wastes containing a nitrate ester (any liquid explosive, *i.e.*, nitroglycerin, diethylene glycol dinitrate), triacetin, acetone, alcohol, or ether, and sawdust. The ignitable or reactive liquids with sawdust typically originate from cleaning operations or spills in the production area. These wastes are identified as Group 1 wastes.

The propellant laboratory waste included in Group 2 consists of waste materials from quality assurance and quality control testing. The propellant laboratory waste is a variable mixture of reactive materials and reagent chemicals used to perform laboratory analysis.

Waste nitrocellulose is non-reusable scrap from production operations, and scrap from the nitrocellulose dehydrating press operations. All such nitrocellulose is generally accumulated in a water-wet state. In the water-wet state this material is not reactive. These wastes, which are classified as Group 3 wastes, are not hazardous.

II.B.3. Waste Accumulation and Handling

Waste materials from the 19 waste groups that are to be treated in the incinerators are stored in less than 90-day accumulation buildings throughout RFAAP in 20 gallon tubs. These tubs of waste are transported to the Grinder Building, where they are prepared for incineration. The frequency of waste pickup varies according to production schedules, occurring as often as daily, however in most cases weekly. All hazardous waste is retrieved and treated or transferred to a permitted hazardous waste storage tank in the Grinder Building, at a minimum, before the 90-day accumulation period expires.

Each container of waste stored or treated in the permitted storage and treatment area is accompanied by an internal manifest sheet that documents the generator of the waste (the Permittee or a RFAAP tenant organization), the point of origin of the waste, the specific type of waste (*e.g.,* type of energetic or waste mixture), and the date on which the waste was generated. Prior to transporting the waste to the permitted storage and treatment area, the waste handler inspects the waste to ensure that it matches the characterization provided on the internal manifest form and to make sure that it fits into one of the 19 categories of waste permitted for treatment in the incinerators.

II.B.4. Waste and Residue Sampling

Two types of sampling are conducted to comply with this Permit: waste sampling and residue sampling. This section provides a description of the techniques employed for both.

II.B.4.a. Waste Sampling

Samples for characterizing the wastes that are stored and treated at the incinerator area are collected on a daily basis as waste is loaded onto the trolley conveyor in preparation to be ground and incinerated. The operator collects grab samples from tubs of each waste group that is being processed. The grab samples are collected into separate sample containers for each group. Each sample container is labeled with the month, the group number or propellant type, the "composite" notation for sample type, and the sampler's initials. At the end of the month, the operator splits the composite sample for one of the waste groups and numbers the container (The duplicate samples are generated for quality assurance, quality control, or results validation. At least one of the duplicate samples is analyzed each month to evaluate the sampling procedure). A sample number is then affixed to each container and the samples are sent to the laboratory for analysis as required to comply with this Permit.

Sample results are then entered into the computer program, which ensures that feed rate limits for each parameter regulated under the HWC NESHAP are being met for the waste treated at the incinerators. These values are not used for evaluation of compliance with any RCRA feed rate limits and the results are not generated to ensure compliance with this permit.

If DEG or TEG water (Groups 5 and 6) are used for slurry makeup water, samples will be collected daily. At the end of the month, all daily samples of DEG or TEG water will be composited into one sample per group. These composites will then be analyzed as required to comply with this Permit.

To ensure that proper sampling technique is employed, all operators that collect samples of the waste streams will be trained in the sample collection procedure during their initial on-the-job training.

II.B.4.b. Residue Sampling

Composite samples of the incinerator residues are collected periodically as required to characterize the wastes for offsite disposal. Samples are collected once per shipment.

II.B.5. Waste Analysis Requirements

All hazardous wastes managed in accordance with the facility’s Permit will be subjected to waste analysis pursuant to the Permit and this Waste Analysis Plan prior to being stored or treated at the permitted treatment and storage areas. The Permittee maintains the responsibility for sampling and analyzing all wastes that are stored and/or treated in the permitted storage and treatment area regardless of whether it was generated by the Permittee or a RFAAP tenant organization.

For each solid or hazardous waste that may be used as a slurry component (see Section II.B.2.) for incineration, a hazardous waste determination will be made in accordance with 9 VAC 20-60-262, adopting 40 CFR 262.11 by reference. At a minimum, the determination will identify:

i. Whether the waste is radioactive;

ii. Whether the waste is listed under 9 VAC 20-60-261, adopting 40 CFR 261 Subpart D by reference; and

iii. Whether the waste is a characteristic hazardous waste in accordance with 9 VAC-20-60-261, adopting 40 CFR 261.20 through 261.24 by reference.

This determination may be made through a combination of process knowledge and laboratory analysis. The results of all hazardous waste determinations will be maintained in the facility operating record.

In addition to the hazardous determination for each waste group, all wastes stored or treated in the permitted storage and treatment area are tested for compatibility with nitroglycerin and nitratability prior to the raw ingredients of that waste being used onsite.

The goal of the compatibility testing is to evaluate the reactivity between the items being tested. Compatibility at the RFAAP is measured following a method found in the *Department of the Army Technical Manual, TM 9-1300-214* – the Taliani test. This test utilizes a multi-test apparatus, which, when completed, provides the data necessary to determine the compatibility of the propellants in the waste groups. Compatibility is based on the amount of gas produced by the mixture of explosive and contact material that is in excess of the amount of gas produced by the materials themselves. The materials are deemed "incompatible" if a mixed sample of the materials generates a specific volume of gas more than the sum of the associated unmixed specimens.

Once this initial compatibility testing is completed on the propellant ingredients, no further compatibility analysis is performed while the waste is being generated. All propellants manufactured at the RFAAP and their ingredients have been determined to be compatible with one another using this methodology.

II.B.5.a. Analysis of Waste Groups

All waste groups are analyzed to determine a profile for the group. This analysis is described in more detail below. The term “analysis” as used herein may include the evaluation of process knowledge or actual sampling and laboratory analysis.

II.B.5.b. Waste Profiling Analysis

At all times an accurate profile of every hazardous waste stored and/or treated at the permitted treatment and storage areas will be maintained in the facility operating record. A hazardous waste profile will identify the hazardous constituents and characteristics necessary for proper designation and management of the waste stream. The profile will also include concentrations of all 40 CFR 261 Appendix VIII (adopted by reference in 9 VAC 20-60-261) constituents in that waste.

Each hazardous waste profile will include or consist of:

a. Existing published or documented data on the hazardous waste or on waste generated from similar processes. The use of existing published or documented data will include confirmation by the generator that the process generating the hazardous waste has not significantly changed; and/or

b. Laboratory analysis of the waste stream consisting of chemical, physical, and/or biological analyses using appropriate tests from the EPA document SW-846 Test Methods for Evaluating Solid Waste, 3rd Edition, 1986, as updated, or by facility standard operating methods have been approved via the Virginia Environmental Laboratory Accreditation Program as an equivalent method.

Every waste profile will be reviewed at least annually in order to confirm that it still accurately represents the waste stream. A waste stream will be re-profiled whenever the Permittee has reason to believe that the process or operation generating the hazardous waste has significantly changed.

II.B.5.c. Analysis of Waste Residues and Other Materials

Incinerator ash, which consists of the solids that accumulate at the kiln breeching, evaporative cooler, and fabric filter, is accumulated in 55-gallon DOT approved containers. Ash and packing media generated from the scrubber on an infrequent basis is also accumulated in 55-gallon DOT approved containers. However, neither the ash from the scrubber system or the packing media are hazardous wastes unless demonstrated such via sampling and analysis or handled as such out of an abundance of caution.

When evaluating any incinerator residues for a hazardous waste determination, a composite sample is collected following standard methods. This composite sample is analyzed for reactivity by methods specified in Appendix II.B-2 and/or for toxicity by the Toxicity Characteristic Leaching Procedure (TCLP), SW-846 Method 1311. If the residue exhibits a characteristic for reactivity it will be taken to the Open Burning Ground for treatment if appropriate. If the residue does not exhibit a characteristic for reactivity but is a hazardous waste according to 9 VAC 20-60-261.24, then it will be managed as a hazardous waste in accordance with all applicable requirements of 9 VAC 20-60. If the residue does not exhibit a characteristic of a hazardous waste it may be managed as a solid waste in accordance with all applicable requirements of 9VAC 20-81-10 *et seq*.

Incinerator scrubber liquid drains from the gas pre-cooler and packed bed liquid scrubber and is collected in the neutralization tank. In the neutralization tank, plant water is added as necessary for volume make-up and the solution pH is adjusted by the addition of caustic. Effluent from the neutralization tank returns directly to the gas pre-cooler and packed bed liquid scrubber. Effluent from the neutralization tank also flows to the brine tank and subsequently to the evaporative cooler. The incinerator scrubber liquid is not discharged under normal operating conditions but rather is recirculated throughout the system. In the event that the scrubber water is not recirculated through the system, it will be collected and transferred to the on-site wastewater treatment facility and disposed of according to the VPDES permit or used as makeup water for grinds.

II.B.5.d. Quality Assurance and Quality Control

All sampling and analyses performed in accordance with this Waste Analysis Plan will, at a minimum, achieve all performance specifications specified in the VELAP approved, site-specific analytical method and quality assurance manual. Records of the specific analytical methods utilized from SW-846 or VELAP approved methods and procedures and appropriate QA/QC documentation will be maintained at RFAAP with the results of all analyses.

Appendix II.B-1

Waste Group Composition Data

TABLE I

WASTE GROUPS BURNED AT THE RFAAP INCINERATORS

Group No.	Description	Defining Characteristics	RCRA Waste Codes [1]
1	Miscellaneous Waste	Ignitable and reactive liquids in sawdust	D001, D003
2	Miscellaneous Waste	Propellant Laboratory Waste	D001, D003, D004-D011, D030
3	Miscellaneous Waste	Waste Nitrocellulose Solid Waste	N/A
4	Miscellaneous Waste	Dinitrotoluene and Trinitrotoluene Wastes from manufacturing that are not listed wastes	D003, D030
5	Liquid Waste	Water Containing Triethylene Glycol Solid Waste	N/A
6	Liquid Waste	Water Containing Diethylene Glycol Solid Waste	N/A
7	Single Base Propellants	Propellant with Nitrocellulose and Lead	D001, D003, D008
8	Single Base Propellants	Propellant with Nitrocellulose	D001, D003
9	Single Base Propellants	Propellant with Nitrocellulose and Dinitrotoluene	D001, D003, D030
10	Double Base Propellants	Propellant with Nitrocellulose and Nitrate Esters	D001, D003
11	Double Base Propellants	Propellant with Nitrocellulose, Nitrate Esters and Perchlorate salts	D001, D003
12	Double Base Propellants	Propellant with Nitrocellulose, Nitrate Esters and Lead	D001, D003, D008
13	Energetics with solid explosives	Propellant with Nitrocellulose, Nitrate Esters or Solid Explosives	D001, D003
14	Triple Base Propellants	Propellant with Nitrocellulose, Nitrate Esters and Nitroguanidine	D001, D003
15	Load, Assemble, & Pack Waste	Energetic materials from manufacturing cartridges	D001, D003
16	Single Base Propellants	Propellant with Nitrocellulose, Dinitrotoluene, and/or Lead	D001, D003, D008, D030

TABLE I

WASTE GROUPS BURNED AT THE RFAAP INCINERATORS

17	Specialty Products Waste	Energetics with Nitrocellulose, Nitrate Esters, Nitroguanidine, Solid Explosives, or Appendix VIII[2] Constituents	D001, D003, D004-D010, D030
18	Specialty Products Waste	Energetics with Nitrocellulose, Nitrate Esters, Nitroguanidine, Solid Explosives, and Appendix VIII Constituents, Chlorides, or Perchlorates	D001, D003, D004-D010, D030
19	Specialty Products Waste	Energetics with Nitrocellulose, Nitrate Esters, Nitroguanidine, Solid Explosives, and Appendix VIII Constituents, or Metals	D001, D003, D004-D010, D030

1. Codes shown represent those RCRA waste codes that the waste **may** exhibit. Not all of the specified codes may apply to every canister of waste treated within this group.

2. 40 CFR 261, Appendix VIII

TABLE II

APPENDIX VIII CONSTITUENTS PRESENT IN RFAAP WASTES

Constituent	Chemical Abstracts Service (CAS) No.
Antimony Compounds N.O.S.	7440-36-0 (Antimony)
Arsenic	7440-38-2
Barium N.O.S.	7440-39-3 (Barium)
Chromium compounds N.O.S.	7440-47-3 (Chromium)
Copper chromite	12053-18-8
Dibutyl phthalate	84-74-2
Diethyl phthalate	117-81-7
2,4-Dinitrotoluene	121-14-2
Diphenylamine	122-39-4
Lead compounds N.O.S.	7439-92-1 (Lead)
Mercury	7439-97-6
Mercuric Compounds N.O.S	7439-97-6 (Mercury)
Nitroglycerin	55-63-0
2-Nitrosodiphenylamine (2-NDPA)	119-75-5
N-Nitrosodiphenylamine (N-NDPA)	311432-60-7
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	2691-41-0
Silver	7440-22-4
Toluene	108-88-3
1,3,5-Trinitroperhydro-1,3,5-triazine (RDX)	121-82-4

Appendix II.B-2

Reactivity Test Methods

Three methods are used to determine reactivity of residue from thermal treatment of reactive wastes.

The first method is performed by the on-site laboratory. A composite sample of the residue is analyzed for the presence of propellant. This method provides results to within a detection limit of less than 1%. Hazards Analysis has a proprietary report that tested explosives in soil. If there is less than 10% explosives in a soil matrix the soil will not be reactive for the Gap test or Deflagration/4-strike Detonation/Transition (DDT) test. Hazards Analysis uses the data from the on-site laboratory to make the determination whether the residue is reactive or not reactive.

The second method is to analyze the composite sample using SW 846 Method 8330. Again using the proprietary report Hazards Analysis uses the data to make the determination whether the residue is reactive or not reactive.

The third method is to use the GAP test or DDT test. These tests are described on the next three pages.

The first method is used for waste characterization residue. This testing is Quality checked by using the second method every 4 ash samples. The third method is done annually to confirm the Hazards Analysis report.

REACTIVITY TEST PROCEDURES
DESCRIPTION OF TESTS

GAP TEST FOR SOLID MATERIALS

The experimental arrangement used for the gap test is shown in Figure B1. The test sample is contained in a cylinder consisting of a 40.6 cm (16-inch) length of cold-drawn seamless carbon steel "mechanical" tubing 4.76 cm (1.875 inches) in outside diameter with a wall thickness of 0.56 cm (0.219 inch) and an inside diameter of 3.65 cm (1.438 inch). The sample in this test is normally either a gel or a granular solid at room temperature that is loaded to the density attained by tapping the cylinder until further settling becomes imperceptible. The bottom of the cylinder is closed with two layers of 0.0076-cm (0.003-inch) thick polyethylene sheet tied on with gum rubber bands and polyvinyl chloride electrical insulating tape. The sample is subjected to the shock wave generated by the detonation of two cast pentolite density 1.65 g/cm^3 (50/50 pentaerythritol tetranitrate PETN/TNT) pellet 5.08 cm (2 inches) in diameter and 2.54 cm (1 inch) thick. The pellets will be in direct contact with the bottom of the sample tube ("zero gap"). The pentolite pellets are initiated by a U.S. Army Engineers special detonator having a base charge of 0.935 gram (14.4 grains) of the PETN and a primary charge of 0.35 gram (5.4 grains) of diazo dinitrophenol which is butted against the bottom surface of the pentolite pellets and held in place by a cylinder or cork. Instrumentation consists of a continuous rate probe made of a thin aluminum tube with an inner diameter of 0.051 cm (0.02 inch) and a wall thickness of 0.0038 cm (0.0015 inch) with an axial enamel-coated resistance wire of 0.0078-cm (0.0031-inch) diameter, having a resistance of 3.0 ohms/cm (7.52 ohms/inch). The outer tubing is crimped against the inner wire at the lower end, forming a resistor. When this assembly is inserted in a medium that transmits a shock wave, the outer wall crushes against the inner wire as the wave moves up the tubing, shortening the effective length and changing the resistance. If a constant current (usually 0.06 ampere) is made to flow between the outer and inner conductors, the voltage between them is proportional to the effective length and can be recorded as a function of time using an oscilloscope. The slope of the oscilloscope trace is thus proportional to the velocity of the shock wave.

Criteria. Results of this test are considered to be positive if a stable propagation velocity greater than 1.5 km/sec is observed. Additional diagnostic information is provided by a mild steel witness plate 15.24 cm (6 inches) square and 0.3175 cm (0.125 inch) thick, mounted at the upper end of the sample tubing and separated from it by spacers 0.16 cm (0.063 inch) thick. A hole punched cleanly through the plate is an indication for a positive result.

A third source of diagnostic information is the fragmentation of the sample tube. The results of the test are considered to be positive only if the tube is fragmented along its entire length. The fragments range, depending on the material tested, from a few long strips to nearly a hundred small fragments; bulging, cracking, or "banana-peeling" of the acceptor is not considered a positive result.

In most cases, the results of the above three diagnostic methods agree. In some they do not, particularly with low-energy, low-density materials, e.g., benzoyl peroxide, in which the witness plate is not punched through, but the tube is fragmented; also with certain propellants, the witness plate is punched, but little damage is done to the tube, evidently indicating a localized explosion at the upper end of the tube. In such cases, since there are essentially three criteria (witness plate, tube fragmentation, and rate probe), the result is assessed on the basis of the two criteria that agree; i.e., if any two criteria indicate a detonation, the result is considered positive, but not so if only one indicates a detonation. Some case of doubtful propagation can also be resolved by using a longer sample tube.

Deflagration/Detonation Transition (DDT) Test The experimental arrangement for the DDT test is shown in Figure B2. The sample of the material to be tested is contained in a 45.7-cm (18-inch) length of 3-inch diameter schedule 80 carbon steel pipe with inside diameter of 7.37 cm (2.9 inches) and wall thickness of 0.75 cm (0.30 inch) , capped at both ends with “3000 pound” forged steel pipe caps.

The sample is subjected to the thermal and pressure stimulus generated by an igniter consisting of a mixture of 50 percent RDX and 50 percent grade FFF_g black powder located at the center of the sample vessel. The igniter assembly consists of a cylindrical container 2.06 cm (0.81 inch) in diameter and of variable length, which is made from 0.0254 cm (0.01 inch) thick cellulose acetate held together by two layers of nylon-filament-reinforced cellulose acetate tape. The length of the igniter capsule is 0.32 cm (0.125 inch) for each gram of igniter material. The igniter capsule contains a small loop formed from a 2.54 cm (1-inch) length of nickel-chromium alloy resistance wire 0.03 cm (0.012 inch) in diameter having a resistance of 0.343 ohms. This loop is attached to two insulating copper tinned lead wires 0.066 cm (0.026 inch) in diameter; the overall wire diameter including insulation is 0.127 cm (0.05 inch). These lead wires are fed through small holes in a brass disc approximately 1 cm (0.4 inch) in diameter and 0.08 cm (0.03 inch) thick, which is soldered to the end of a 23-cm (9-inch) length of “1/8-inch” steel pipe having a diameter of 1.03 cm (0.405 inch); this pipe is threaded to the other end and screwed into a threaded hole on the inside of one of the pipe caps. This pipe supports the igniter capsule and serves as channel for the igniter wires. The igniter is fired by a current of 15 amperes obtained from a 20-volt transformer.

Criteria. The criterion currently used in the interpretation of this test is that for a positive result either the pipe or at least one of the end caps be fragmented into at least two distinct pieces, i.e., results in which the pipe is merely split or laid open or in which the pipe or caps are distorted to the point at which the caps are blown off are considered to be negative results. Although it may be argued that a small number of fragments does not indicate the development of a detonation, it at least indicates a very rapidly rising pressure which in a larger sample could lead to development of detonation.

Figure B1. Experimental arrangement for zero gap test
Source: U.S. Bureau of Mines, Department of the Interior

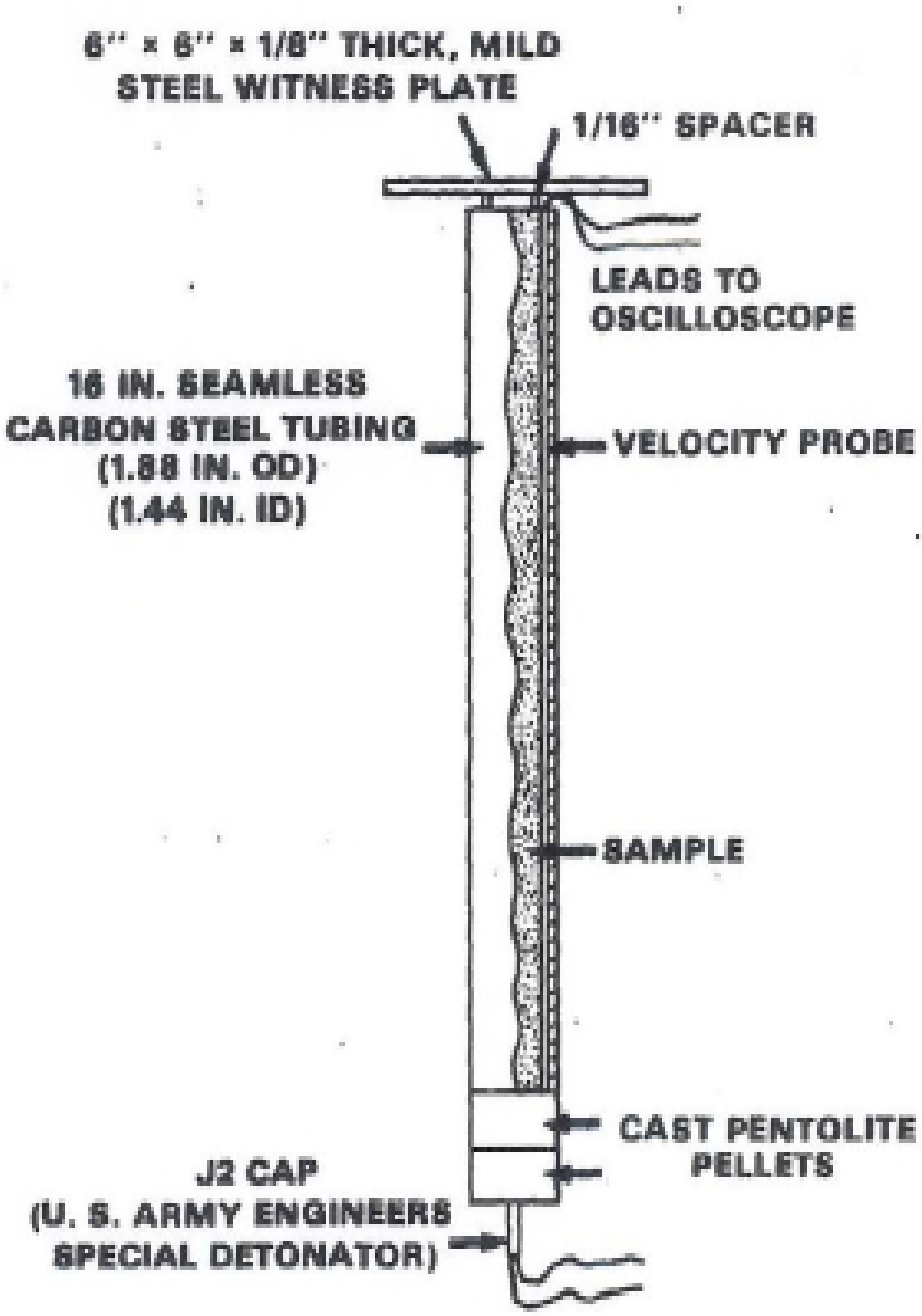
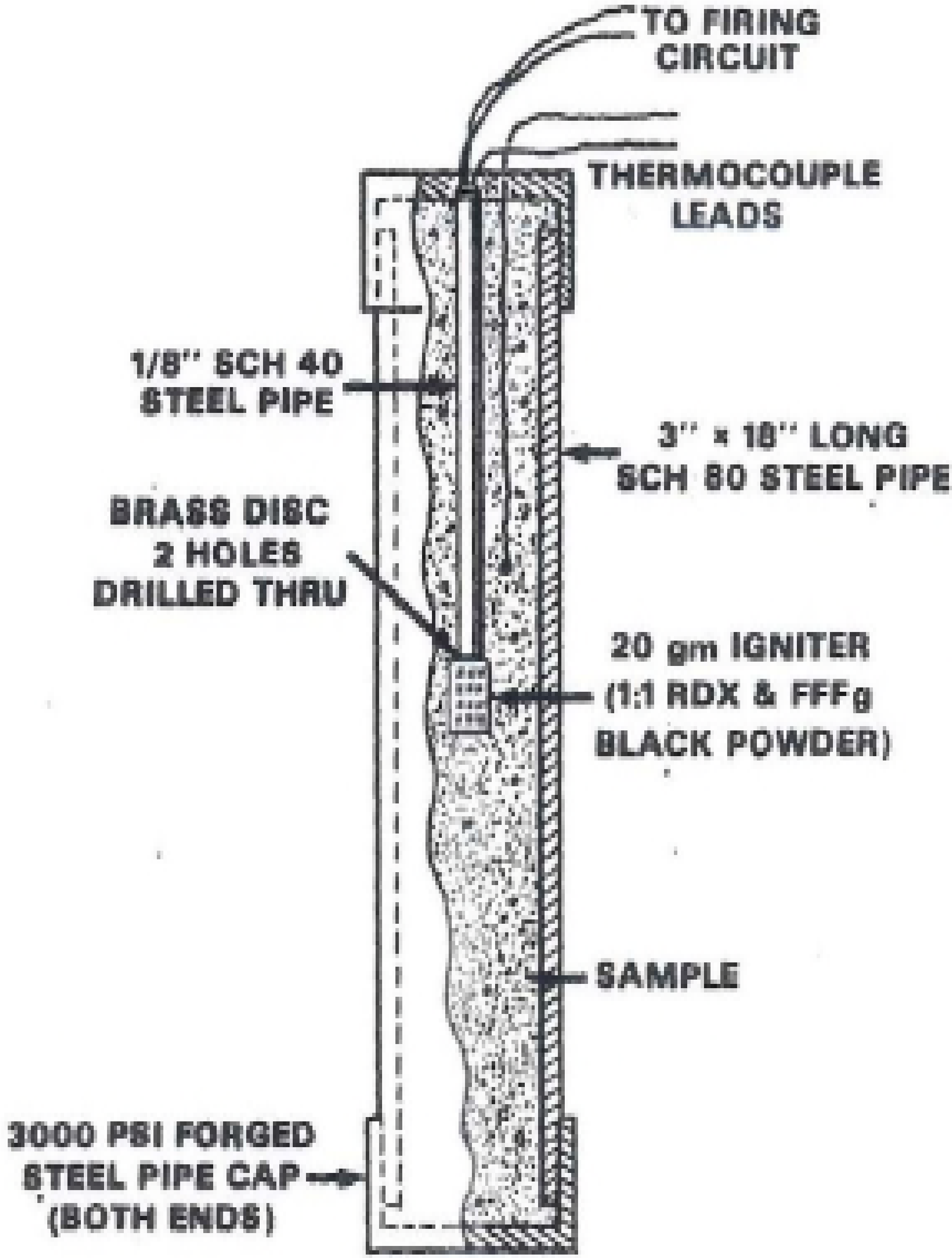


Figure B2. Experimental arrangement for deflagration-detonation transition test
Source: Hercules Incorporated (Radford Army Ammunition Plant)



Attachment II.Ba - Waste Analysis Plan for the EWI-CWP Complex

II.Ba.1. Waste Characteristics

Those hazardous wastes that may be stored and/or treated at the EWI-CWP complex are waste energetic materials and spill "clean-up" residues generated at the Radford Army Ammunition Plant (RFAAP) by either the contracted operator (the Permittee) or one of the RFAAP tenant organizations. No wastes generated outside of the RFAAP will be received, stored, or treated at the EWI-CWP complex. (Note that all RFAAP tenant waste is managed as an onsite waste stream, with the generation date of the waste assigned when the tenant generates the waste and tracking of the waste stream handled from this point of generation to the point of disposal or treatment at the EWI-CWP complex).

The wastes that are stored and treated in accordance with this Permit are hazardous due to their ignitability (D001), reactivity (D003), and/or toxicity for certain metals and organics. In addition, several listed wastes may be treated in the EWI-CWP complex. These include discarded commercial chemical products that result from spills in the various process areas or other commercial chemical products that are unsuitable for use. Only those hazardous wastes that are within the specifications of the facility's RCRA Permit and this Waste Analysis Plan will be stored and/or treated in the EWI-CWP complex. Neither radioactive wastes, nor mixed radioactive and hazardous wastes will be stored and/or treated at the EWI-CWP complex.

In general, the managed wastes include wastes that exhibit the following hazardous characteristic(s);

i. Ignitability (hazardous waste number D001) as specified in 9 VAC 20-60-261, incorporating 40 CFR §261.21 by reference;

ii. Toxicity, as specified in 9 VAC 20-60-261, incorporating 40 CFR §261.24 by reference, for one or more of the following contaminants:

   a) Arsenic (hazardous waste number D004);

   b) Barium (hazardous waste number D005);

   c) Cadmium (hazardous waste number D006);

   d) Chromium (hazardous waste number D007);

   e) Lead (hazardous waste number D008);

   f) Mercury (hazardous waste number D009);

g) Silver (hazardous waste number D011); and

h) 2,4-Dinitrotoluene (hazardous waste number D030).

iii. Reactivity (hazardous waste number D003) as specified in 9 VAC 20-60-261, incorporating 40 CFR §261.23 by reference.

In addition, several listed wastes may be treated at the EWI-CWP complex. These wastes result from spills of commercial chemical products used at the RFAAP, or other situations that result in the commercial chemical products being discarded. These wastes are not routinely treated in the units, but may be treated from time to time as required and include:

i. Nitroglycerin (P081)

ii. Acetone (U002)

iii. Dibutyl phthalate (U069)

iv. 2,4-Dinitrotoluene (U105)

v. Ethyl ether (U117)

A specific list of those wastes permitted for storage and treatment in the EWI-CWP complex is provided in Table Ia of Appendix II.Ba-1. As shown in the table, the wastes are classified into one of 28 different waste groups that are described in detail in Section II.Ba.2. These group numbers were assigned as the information on the waste groups was collected. There is no significance to the order of the discussion in Section II.Ba.2 below or the group numbers in Table Ia of Appendix II.Ba-1.

II.Ba.2. Waste Composition and Characterization

The composition of the energetic waste mixtures generated and fed to the rotary kiln incinerators and CBC varies due to changes in the production schedule. However, all of the wastes can be categorized into one of the 28 groups of waste identified in Table Ia of Appendix II.Ba-1. This table identifies each waste by group number and specifies the RCRA hazardous waste codes that may be applicable to that group. Information on the 40 CFR §261 Appendix VIII constituents that may be present in each group is provided in Table IIa of Appendix II.Ba-1.

If the Permittee wishes to store or treat waste whose formulation is not consistent with one of the groups identified in Table Ia of Appendix II.Ba-1 in the EWI-CWP complex, the Permittee shall submit a request for permit modification.

II.Ba.2.a. Off-Specification Propellant and Propellant Production Intermediates

Table Ia of Appendix II.Ba-1 identifies nine groups that contain single, double, or triple base propellants and propellant intermediates. These three categories of propellant differ in their primary energetic constituents as follows:

- Single base propellants contain nitrocellulose;
- Double base propellants contain two energetics, typically nitrocellulose and nitroglycerin; and
- Triple base propellants contain three energetics, typically nitrocellulose, nitroglycerin, and nitroguanidine.

These nine groups have been divided based on the primary propellant category and other waste constituents that distinguish them from each other. The nine groups are as shown in Table Ia in Appendix II.Ba-1. Single base propellants are represented as Groups 7 through 9 and 16, double base propellants as Groups 10 through 12, and triple base propellants as Group 14.

Propellant contaminated hazardous wastes will be identified using the group associated with the specific propellant that contaminates the item unless the material requires an aid to burn or is contaminated with multiple waste groups. In these cases, the material will be identified as Group 20.

II.Ba.2.b. Liquid Wastes with Glycol

The waste streams containing diethylene glycol (DEG) and triethylene glycol (TEG) are generated from the washing of nitroglycerin (NG) and diethylene glycol dinitrate (DEGDN) with water to remove the desensitizing agents DEG and TEG from the NG and DEGDN. These waste streams are non-hazardous. They contain water (80-85%) and glycol (15-20%) and may be used in the production of slurry batches for incineration. The waste groups for these streams are identified in Table Ia of Appendix II.Ba-1 as Group 5 (TEG Water) and Group 6 (DEG Water).

II.Ba.2.c. Liquid Scrubber Blowdown Waste

The packed bed scrubbers included in each of the air pollution control systems generate a small blowdown stream to maintain quality of the scrubber water recycle stream. This liquid stream is accumulated in the scrubber blowdown tank and used as makeup water for the wet ash system. When generation of the scrubber blowdown exceeds that required for the wet ash system, this water may be used as makeup water for grinds. This stream has already received pH adjustment in the scrubber and is therefore not a corrosive hazardous waste. In fact, the waste stream is non-hazardous and consists mainly of salts in a liquid solution or suspension generated from scrubber operations. As it is necessary to track both hazardous and non-hazardous feedstreams for HWC NESHAP compliance, this waste has been assigned a separate group number. The stream is identified in Table Ia of Appendix II.Ba-1 as Group 21.

II.Ba.2.d. Load, Assemble, and Pack Waste

The load, assemble, and pack waste consists of energetic wastes and energetic contaminated hazardous waste generated when ammunition cartridges are assembled. The waste consists of materials that are placed in the cartridges such as HMX, RDX, and propellants or items contaminated with these materials. These wastes are identified in Appendix II.Ba-1 Table Ia as Group 15.

The finished products from the load, assemble, and pack operations, including the off-specification projectiles that contain energetic materials and cases with primers shall not be treated or stored in the EWI-CWP complex.

II.Ba.2.e. Specialty Products Waste

The specialty products waste groups (17, 18, and 19) contain energetic materials such as nitrocellulose, nitrate esters, nitroguanidine, solid explosives, and 40 CFR §261, Appendix VIII constituents, or hazardous wastes that are contaminated with them. These wastes are generated in small quantities. The specialty products wastes identified as Group 18 on Table Ia of Appendix II.Ba-1 also contain chlorides or perchlorates. The specialty products wastes identified as Group 19 on Table Ia of Appendix II.Ba-1 contain metals in addition to the other materials contained in specialty product wastes.

II.Ba.2.f. Ignitable and Reactive Liquids in Sawdust

The term ignitable and reactive liquids in sawdust refers to wastes containing a nitrate ester (any liquid explosive, *i.e.*, nitroglycerin, diethylene glycol dinitrate), triacetin, acetone, alcohol, or ether, and sawdust. The ignitable or reactive liquids with sawdust typically originate from cleaning operations or spills in the production area. These wastes are identified as Group 1 wastes.

II.Ba.2.g. Propellant Laboratory Waste

The propellant laboratory waste included in Group 2 consists of waste materials from quality assurance and quality control testing. The propellant laboratory waste is a variable mixture of reactive materials and reagent chemicals used to perform laboratory analysis.

II.Ba.2.h. Waste Nitrocellulose

Waste nitrocellulose is non-reusable scrap from production operations, and scrap from the nitrocellulose dehydrating press operations. All such nitrocellulose is generally accumulated in a water-wet state. In the water-wet state this material is not reactive and a non-hazardous waste. As it is necessary to track both hazardous and non-hazardous feedstreams for HWC NESHAP compliance, this waste has been assigned a separate group number. The stream is identified in Table Ia of Appendix II.Ba-1 as Group 3.

II.Ba.2.i. DNT and TNT Manufacturing Wastes

Currently, RFAAP purchases the dinitrotoluene (DNT) and trinitroluene (TNT) required for manufacture of their propellants. However, at prior times in plant history, RFAAP has manufactured these materials onsite and maintains the capability to do so. This waste stream, identified as Group 4, is associated with wastes from those manufacturing processes. As the materials are fabricated at RFAAP and not purchased commercial chemical products, they do not meet the classification for the listed versions of these chemicals. They are provided the associated D-toxicity code rather than the listed P- or U-code.

II.Ba.2.j. Discarded Commercial Chemical Products

In the process of producing propellants and propellant intermediates, RFAAP uses a variety of commercial chemical products. Generally, these commercial chemical products are used in the process and not associated with any specific waste stream. However, it is possible that one of these products may be spilled or otherwise need to be discarded. For this purpose, RFAAP maintains the codes necessary to thermally treat these discarded commercial products. As the chemical characterization of each of these wastes is different, each of the 7 listed wastes is assigned a separate waste group. These listed wastes are assigned to Group 23 (P-wastes), and 25 through 28 (U-wastes).

II.Ba.2.k. Screening and Floor Wastes with Foreign Object Debris

The wastes in Group 20 are a combination of materials from all other waste groups, except for specific waste Groups 2, 3, 5, and 6, and the listed waste groups (Group 23 and 25-28). These include pit waste from production building wash downs, floor sweepings from production buildings that could potentially be contaminated with metal, rocks or other foreign object debris (FOD) that could cause an explosion at the Grinder Building, and/or other materials that are contaminated with sufficient propellant or energetics such that they are characterized as reactive or ignitable. Generally, this group requires an aid to burn.

Because these wastes are a combination of many different waste groups, there is not one simple characterization that adequately describes them. To permit adequate tracking and prediction of constituent concentrations, each generating area is assigned their own Group 20 waste code. This consists of the group number (20) and the associated building number (for example, pit waste from building 9213 would be assigned Group 20.9213).

II.Ba.2.l. Recycled Decant Water

After wastes are ground and placed into a slurry tank, excess water is decanted from the tank to bring the wastes to a proper ratio for thermal treatment. The decanted water is sent back to the decant tank, where it is used in future grinds. Because listed wastes may be ground in the process and because some small amount of solids may be carried back via the decant process, this waste is treated as a hazardous waste. This waste stream is assigned to Group 24.

II.Ba.3. Contaminated Combustible Non-Hazardous Wastes

To offset natural gas usage, RFAAP also feeds contaminated combustible wastes to the rotary kiln incinerators. These wastes are non-hazardous but are classified as “materially potentially presenting an energetic hazard” (MPPEH). Because of this potential for minute levels of contamination, the materials cannot be disposed as municipal refuse. However, these materials represent significant fuel value. By disposing of these materials in the rotary kiln incinerators, RFAAP is able to eliminate the energetic hazard and reduce natural gas use in the kilns, providing valuable energy recovery from these wastes. As it is necessary to track both hazardous and non-hazardous feedstreams for HWC NESHAP compliance, this waste has been assigned a separate group number. The stream is identified in Table Ia of Appendix II.Ba-1 as Group 22. Each type of non-hazardous combustible waste will be assigned a subgroup to allow proper characterization of the waste for compliance with feed rate limits provided in the facility’s Title V permit.

II.Ba.4. Waste Accumulation and Handling

Waste materials from the 28 waste groups that are to be treated at the EWI-CWP complex are stored in central accumulation buildings throughout RFAAP in 20-gallon tubs. These tubs of waste are transported to the Grinder Building and the Loading Building, where they are prepared for thermal treatment. The frequency of waste pickup varies according to production schedules, occurring as often as daily, however in most cases weekly. All hazardous waste is retrieved and treated, or transferred to a permitted hazardous waste storage tank in the Grinder Building, at a minimum, before the 90-day storage period expires.

Each container of waste stored or treated at the EWI-CWP complex is accompanied by an internal manifest sheet that documents the generator of the waste (the Permittee or a RFAAP tenant organization), the point of origin of the waste, the specific type of waste (*e.g.*, type of energetic or waste mixture), and the date on which the waste was generated. Prior to transporting the waste to the EWI-CWP complex, the waste handler inspects the waste to ensure that it matches the characterization provided on the internal manifest form and to make sure that it fits into one of the designated categories of waste permitted for treatment at the EWI-CWP complex.

II.Ba.5. Waste and Residue Sampling

Two types of sampling are conducted to comply with this Permit: waste sampling and residue sampling. This section provides a description of the techniques employed for both.

II.Ba.5.a. Waste Sampling

Samples for characterizing the wastes that are stored and treated at the EWI-CWP complex are collected on a daily basis as waste is loaded onto the conveyor in the Grinder Building, or as it is loaded onto a tray for treatment in the CBC. The operator collects grab samples from tubs of each waste group that is being processed. The grab samples are collected into separate sample containers for each group. Each sample container is labeled with the date of the composite sample, the group number or propellant type, the "composite" notation for sample type, and the sampler's initials. Each grab sample that is collected is recorded on a sample log that is maintained with at the EWI-CWP complex. This log records the waste sampled, the date the grab sample was collected, and the name of the person that pulled the sample. At the end of the month, the operator splits the composite sample for one of the waste groups and numbers the container. (The duplicate samples are generated for quality assurance, quality control, or results validation. At least one of the duplicate samples is analyzed each month to evaluate the sampling procedure). A sample number is then affixed to each container and the samples are sent to the laboratory for analysis as required to comply with this Permit.

Any liquid waste streams used for makeup water (in place of process water or recycled decant water) will be accumulated in the makeup tank. Once the tank is full, or otherwise determined for use, a sample will be collected from the tank. This sample will be assigned a unique sample number and will be analyzed by the laboratory. The results of the analysis will used to determine compliance with this Permit. As with the propellant samples, duplicate samples will be collected for quality assurance and quality control.

As the recycled decant water is generated on a routine basis, grab samples of the decant water will be collected on a weekly basis. These grab samples will be combined into one composite for the month. A sample number will be affixed to the composite and it will be sent to the laboratory for analysis as required to comply with this Permit. As with the propellant samples, duplicate samples will be collected for quality assurance and quality control.

To ensure that proper sampling technique is employed, all operators that collect samples of the waste streams will be trained in the sample collection procedure during their initial on-the-job training.

II.Ba.5.b. Residue Sampling

Composite samples of the incinerator residues are collected periodically as required to characterize the wastes for offsite disposal. Samples are collected once per shipment. Prior to analysis (and shipment), these residues are accumulated in the satellite accumulation areas throughout the EWI-CWP complex or stored in the central accumulation area provided adjacent to the Loading Building.

II.Ba.6. Waste Analysis Requirements

All hazardous wastes managed in accordance with the facility's Permit will be subjected to waste analysis pursuant to the Permit and this Waste Analysis Plan prior to being stored or treated at the EWI-CWP complex. The Permittee maintains the responsibility for sampling and analyzing all wastes that are stored and/or treated in the EWI-CWP complex regardless of whether it was generated by the Permittee or a RFAAP tenant organization.

For each solid or hazardous waste that may be used as a slurry component (see Section II.Ba.2.) for incineration or that may be treated in the CBC, a hazardous waste determination will be made in accordance with 9 VAC 20-60-262, adopting 40 CFR §262.11 by reference. At a minimum, the determination will identify:

i. Whether the waste is radioactive;

ii. Whether the waste is listed under 9 VAC 20-60-261, adopting 40 CFR Part 261 Subpart D by reference; and

iii. Whether the waste is a characteristic hazardous waste in accordance with 9 VAC-20-60-261, adopting 40 CFR §§261.20 through 261.24 by reference.

This determination may be made through a combination of process knowledge and laboratory analysis. The results of all hazardous waste determinations will be maintained in the facility operating record.

In addition to the hazardous determination for each waste group, all wastes stored or treated at the EWI-CWP complex are tested for compatibility. As the wastes themselves are merely wasted versions of propellant products or ingredients, the compatibility testing is performed on the individual propellants and intermediates rather than the waste materials. If the propellants and propellant ingredients are compatible, then the wasted versions of those propellants will also be compatible.

The goal of the compatibility testing is to evaluate the reactivity between the items being tested. Compatibility at the RFAAP is measured by two of the three methods per *Department of the Army Technical Manual, TM 9-1300-214*. The first type of compatibility testing is the Taliani test. This test utilizes a multi-test apparatus, which, when completed, provides the data necessary to determine the compatibility of the propellants in the waste groups. Compatibility is based on the amount of gas produced by the mixture of explosive and contact material that is in excess of the amount of gas produced by the materials themselves. The materials are deemed "incompatible" if a mixed sample of the materials generates a specific volume of gas more than the sum of the associated unmixed specimens.

The second compatibility test performed at RFAAP is a Heat Test. Heat tests are performed at various designated controlled temperatures (maintained within 0.5 degrees Celsius) over specified time-frames for single-base, double-base, and triple-base propellants. Compatibility is based on the time required for an indicator paper to change color.

Once this initial compatibility testing is completed on the propellants and the propellant ingredients, no further compatibility analysis is performed while the waste is being generated. All propellants manufactured at the RFAAP and their ingredients have been determined to be compatible with one another using one of these two methods.

II.Ba.6.a. Analysis of Waste Groups

All waste groups are analyzed to determine a profile for the group. This analysis is described in more detail below.

II.Ba.6.b. Waste Profiling Analysis

At all times an accurate profile of every hazardous waste stored and/or treated at the EWI-CWP complex will be maintained in the facility operating record. A hazardous waste profile will identify the hazardous constituents and characteristics necessary for proper designation and management of the waste stream. The profile will also include concentrations of all 40 CFR 261 Appendix VIII (adopted by reference in 9 VAC 20-60-261) constituents in that waste.

Each hazardous waste profile will include or consist of:

a. Existing published or documented data on the hazardous waste or on waste generated from similar processes. The use of existing published or documented data will include confirmation by the generator that the process generating the hazardous waste has not significantly changed; and/or

b. Laboratory analysis of the waste stream consisting of chemical, physical, and/or biological analyses using appropriate tests from the EPA document SW-846 Test Methods for Evaluating Solid Waste, 3rd Edition, 1986, as updated, or by facility standard operating methods have been approved via the Virginia Environmental Laboratory Accreditation Program as an equivalent method.

Every waste profile will be reviewed at least annually in order to confirm that it still accurately represents the waste stream. A waste stream will be re-profiled whenever the Permittee has reason to believe that the process or operation generating the hazardous waste has significantly changed.

II.Ba.6.c. Analysis of Waste Residues and Other Materials

Various residues are generated at the EWI-CWP complex as a result of the treatment operations. These include:

- Incinerator ash, which includes the solids that accumulate at the kiln breeching, evaporative cooler, and baghouse of each air pollution control system;

- CBC ash, which includes the solids that remain in the CBC tray after thermal treatment of CBC wastes; and,

- Ash, sludge, and packing media generated in the scrubber sump on an infrequent basis.

Each of these residues are accumulated in 55-gallon Department of Transportation (DOT) approved containers. Once full, these 55-gallon containers are transferred to the central accumulation area adjacent to the Loading Building.

Prior to shipment, a composite sample of each residue stream is collected. All incinerator and CBC ash composite samples are analyzed for reactivity by methods specified in Appendix II.Ba-2. All of the residue samples are analyzed for toxicity by the Toxicity Characteristic Leaching Procedure (TCLP), SW-846

Method 1311. If the ash exhibits a characteristic for reactivity it will be thermally treated in the CBC to eliminate the reactive characteristic of the waste. If the ash does not exhibit a characteristic for reactivity but is otherwise classified as a hazardous waste according to 9 VAC 20-60-261.24, then it will be managed as a hazardous waste in accordance with all applicable requirements of 9 VAC 20-60. If the ash or the scrubber residues do not exhibit a characteristic of a hazardous waste or was not generated from thermal treatment of listed waste, it may be managed as a solid waste in accordance with all applicable requirements of 9VAC 20-81-10 *et seq.*

II.Ba.6.d. Quality Assurance and Quality Control

All sampling and analyses performed in accordance with this Waste Analysis Plan will, at a minimum, achieve all performance specifications specified in the Virginia Environmental Laboratory Accreditation Program (VELAP) approved, site-specific analytical method and quality assurance manual, or the SW-846 method. Records of the specific analytical methods utilized from SW-846 or VELAP approved methods and procedures and appropriate QA/QC documentation will be maintained at RFAAP with the results of all analyses.

Appendix II.Ba-1

Waste Group Composition Data

Table Ia
Waste Groups Burned at the EWI-CWP Complex

Group No.	Description	Defining Characteristics	RCRA Waste Codes 1
1	Miscellaneous Waste	Ignitable and reactive liquids in sawdust	D001, D003
2	Miscellaneous Waste	Propellant Laboratory Waste	D001, D003, D004-D011, D030
3	Miscellaneous Waste	Waste Nitrocellulose (non-hazardous)	N/A
4	Miscellaneous Waste	Dinitrotoluene and Trinitrotoluene Wastes from manufacturing or wastes contaminated with these materials that are not listed wastes	D003, D030
5	Liquid Waste	Water Containing Triethylene Glycol (non-hazardous)	N/A
6	Liquid Waste	Water Containing Diethylene Glycol (non-hazardous)	N/A
7	Single Base Propellants	Propellant with Nitrocellulose and Lead or wastes contaminated with these materials	D001, D003, D008
8	Single Base Propellants	Propellant with Nitrocellulose or wastes contaminated with these materials	D001, D003
9	Single Base Propellants	Propellant with Nitrocellulose and Dinitrotoluene or wastes contaminated with these materials	D001, D003, D030
10	Double Base Propellants	Propellant with Nitrocellulose and Nitrate Esters or wastes contaminated with these materials	D001, D003
11	Double Base Propellants	Propellant with Nitrocellulose, Nitrate Esters and Perchlorate salts or wastes contaminated with these materials	D001, D003
12	Double Base Propellants	Propellant with Nitrocellulose, Nitrate Esters and Lead or wastes contaminated with these materials	D001, D003, D008
13	Energetics with solid explosives	Propellant with Nitrocellulose, Nitrate Esters or Solid Explosives or wastes contaminated with these materials	D001, D003

Group No.	Description	Defining Characteristics	RCRA Waste Codes 1
14	Triple Base Propellants	Propellant with Nitrocellulose, Nitrate Esters and Nitroguanidine or wastes contaminated with these materials	D001, D003
15	Load, Assemble, & Pack Waste	Energetic materials from manufacturing cartridges or wastes contaminated with these materials	D001, D003
16	Single Base Propellants	Propellant with Nitrocellulose, Dinitrotoluene, and/or Lead or wastes contaminated with these materials	D001, D003, D008, D030

Group No.	Description	Defining Characteristics	RCRA Waste Codes 1
17	Specialty Products Waste	Energetics with Nitrocellulose, Nitrate Esters, Nitroguanidine, Solid Explosives, or Appendix VIII[2] Constituents or wastes contaminated with these materials	D001, D003, D004-D010, D030
18	Specialty Products Waste	Energetics with Nitrocellulose, Nitrate Esters, Nitroguanidine, Solid Explosives, and Appendix VIII Constituents, Chlorides, or Perchlorates or wastes contaminated with these materials	D001, D003, D004-D010, D030
19	Specialty Products Waste	Energetics with Nitrocellulose, Nitrate Esters, Nitroguanidine, Solid Explosives, and Appendix VIII Constituents, or Metals or wastes contaminated with these materials	D001, D003, D004-D010, D030
20	Screening and Floor Wastes with FOD	Energetic or energetic contaminated items that may require an aid to burn or a wastes contaminated with a mixture of wastes from different waste groups	D001, D003, D004-D011, D030
21	Scrubber Blowdown Waste	Liquid waste generated from the packed bed scrubbers' blowdown stream (non-hazardous).	N/A
22	Combustible MPPEH	Contaminated, combustible waste that potentially presents an energetic hazard (non-hazardous).	N/A
23	Listed Nitroglycerine Waste	Discarded commercial, nitroglycerine, generated from spills of commercial product, or otherwise needing to be discarded.	P081
24	Recycled Decant Water	Recycled water from the decant process associated with slurry batch formulation.	D001, D003, D004-D011, D030, P081, U002, U069, U105, U117
25	Listed Acetone Waste	Discarded commercial, acetone, generated from spills of commercial product, or otherwise needing to be discarded.	U002

Group No.	Description	Defining Characteristics	RCRA Waste Codes 1
26	Listed Dibutyl Phthalate Waste	Discarded commercial, dibutyl phthalate, generated from spills of commercial product, or otherwise needing to be discarded.	U069
27	Listed 2,4-DNT Waste	Discarded commercial, 2,4-dinitrotoluene, generated from spills of commercial product, or otherwise needing to be discarded.	U105
28	Listed Ethyl Ether Waste	Discarded commercial, ethyl ether, generated from spills of commercial product, or otherwise needing to be discarded.	U117

[1] Codes shown represent those RCRA waste codes that the waste may exhibit. Not all of the specified codes may apply to every canister of waste treated within this group.

[2] 40 CFR §261, Appendix VIII

Table IIa
Appendix VIII Constituents Found in Wastes Treated at the EWI-CWP

Constituent	Chemical Abstracts Service (CAS) No.
Antimony Compounds N.O.S.	7440-36-0 (Antimony)
Arsenic	7440-38-2
Barium N.O.S.	7440-39-3 (Barium)
Chromium compounds N.O.S.	7440-47-3 (Chromium)
Copper chromite	12053-18-8
Dibutyl phthalate	84-74-2
Diethyl phthalate	117-81-7
2,4-Dinitrotoluene	121-14-2
Diphenylamine	122-39-4
Lead compounds N.O.S.	7439-92-1 (Lead)
Mercury	7439-97-6
Mercuric Compounds N.O.S	7439-97-6 (Mercury)
Nitroglycerin	55-63-0
2-Nitrosodiphenylamine (2-NDPA)	119-75-5
N-Nitrosodiphenylamine (N-NDPA)	311432-60-7
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	2691-41-0
Silver	7440-22-4
Toluene	108-88-3
1,3,5-Trinitroperhydro-1,3,5-triazine (RDX)	121-82-4

Appendix II.Ba-2

Reactivity Test Methods

Three methods are used to determine reactivity of residue from thermal treatment of reactive wastes.

The first method is performed by the onsite laboratory. A composite sample of the residue is analyzed for the presence of propellant. This method provides results to within a detection limit of less than 1%. Hazards Analysis has a proprietary report that tested explosives in soil. If there is less than 10% explosives in a soil matrix the soil will not be reactive for the Gap test or Deflagration/4-strike Detonation/Transition (DDT) test. Hazards Analysis uses the data from the onsite laboratory to make the determination whether the residue is reactive or not reactive.

The second method is to analyze the composite sample using SW 846 Method 8330. Again using the proprietary report Hazards Analysis uses the data to make the determination whether the residue is reactive or not reactive.

The third method is to use the GAP test or DDT test. These tests are described on the next three pages.

The first method is used for waste characterization residue. This testing is quality-checked by using the second method every 4 ash samples. The third method is done annually to confirm the Hazards Analysis report.

REACTIVITY TEST PROCEDURES
DESCRIPTION OF TESTS

GAP TEST FOR SOLID MATERIALS

The experimental arrangement used for the Gap Test is shown in Figure B1. The test sample is contained in a cylinder consisting of a 40.6 cm (16-inch) length of cold-drawn seamless carbon steel "mechanical" tubing 4.76 cm (1.875 inches) in outside diameter with a wall thickness of 0.56 cm (0.219 inch) and an inside diameter of 3.65 cm (1.438 inch). The sample in this test is normally either a gel or a granular solid at room temperature that is loaded to the density attained by tapping the cylinder until further settling becomes imperceptible. The bottom of the cylinder is closed with two layers of 0.0076-cm (0.003-inch) thick polyethylene sheet tied on with gum rubber bands and polyvinyl chloride electrical insulating tape. The sample is subjected to the shock wave generated by the detonation of two cast pentolite density 1.65 g/cm^3 (50/50 pentaerythritol tetranitrate PETN/TNT) pellet 5.08 cm (2 inches) in diameter and 2.54 cm (1 inch) thick. The pellets will be in direct contact with the bottom of the sample tube ("zero gap"). The pentolite pellets are initiated by a U.S. Army Engineers special detonator having a base charge of 0.935 gram (14.4 grains) of the PETN and a primary charge of 0.35 gram (5.4 grains) of diazo dinitrophenol which is butted against the bottom surface of the pentolite pellets and held in place by a cylinder or cork. Instrumentation consists of a continuous rate probe made of a thin aluminum tube with an inner diameter of 0.051 cm (0.02 inch) and a wall thickness of 0.0038 cm (0.0015 inch) with an axial enamel-coated resistance wire of 0.0078-cm (0.0031-inch) diameter, having a resistance of 3.0 ohms/cm (7.52 ohms/inch). The outer tubing is crimped against the inner wire at the lower end, forming a resistor. When this assembly is inserted in a medium that transmits a shock wave, the outer wall crushes against the inner wire as the wave moves up the tubing, shortening the effective length and changing the resistance. If a constant current (usually 0.06 ampere) is made to flow between the outer and inner conductors, the voltage between them is proportional to the effective length and can be recorded as a function of time using an oscilloscope. The slope of the oscilloscope trace is thus proportional to the velocity of the shock wave.

Criteria. Results of this test are considered to be positive if a stable propagation velocity greater than 1.5 km/sec is observed. Additional diagnostic information is provided by a mild steel witness plate 15.24 cm (6 inches) square and 0.3175 cm (0.125 inch) thick, mounted at the upper end of the sample tubing and separated from it by spacers 0.16 cm (0.063 inch) thick. A hole punched cleanly through the plate is an indication for a positive result.

A third source of diagnostic information is the fragmentation of the sample tube. The results of the test are considered to be positive only if the tube is fragmented along its entire length. The fragments range, depending on the material tested, from a few long strips to nearly a hundred small fragments; bulging, cracking, or "banana-peeling" of the acceptor is not considered a positive result.

In most cases, the results of the above three diagnostic methods agree. In some they do not, particularly with low-energy, low-density materials, e.g., benzoyl peroxide, in which the witness plate is not punched through, but the tube is fragmented; also with certain propellants, the witness plate is punched, but little damage is done to the tube, evidently indicating a localized explosion at the upper end of the tube. In such cases, since there are essentially three criteria (witness plate, tube fragmentation, and rate probe), the result is assessed on the basis of the two criteria that agree; i.e., if any two criteria indicate a detonation, the result is considered positive, but not so if only one indicates a detonation. Some case of doubtful propagation can also be resolved by using a longer sample tube.

Deflagration/Detonation Transition (DDT) Test The experimental arrangement for the DDT test is shown in Figure B2. The sample of the material to be tested is contained in a 45.7-cm (18-inch) length of 3-inch diameter schedule 80 carbon steel pipe with inside diameter of 7.37 cm (2.9 inches) and wall thickness of 0.75 cm (0.30 inch) , capped at both ends with "3000 pound" forged steel pipe caps.

The sample is subjected to the thermal and pressure stimulus generated by an igniter consisting of a mixture of 50 percent RDX and 50 percent grade FFF_g black powder located at the center of the sample vessel. The igniter assembly consists of a cylindrical container 2.06 cm (0.81 inch) in diameter and of variable length, which is made from 0.0254 cm (0.01 inch) thick cellulose acetate held together by two layers of nylon-filament-reinforced cellulose acetate tape. The length of the igniter capsule is 0.32 cm (0.125 inch) for each gram of igniter material. The igniter capsule contains a small loop formed from a 2.54 cm (1-inch) length of nickel-chromium alloy resistance wire 0.03 cm (0.012 inch) in diameter having a resistance of 0.343 ohms. This loop is attached to two insulating copper tinned lead wires 0.066 cm (0.026 inch) in diameter; the overall wire diameter including insulation is 0.127 cm (0.05 inch). These lead wires are fed through small holes in a brass disc approximately 1 cm (0.4 inch) in diameter and 0.08 cm (0.03 inch) thick, which is soldered to the end of a 23-cm (9-inch) length of "1/8-inch" steel pipe having a diameter of 1.03 cm (0.405 inch); this pipe is threaded to the other end and screwed into a threaded hole on the inside of one of the pipe caps. This pipe supports the igniter capsule and serves as channel for the igniter wires. The igniter is fired by a current of 15 amperes obtained from a 20-volt transformer.

Criteria. The criterion currently used in the interpretation of this test is that for a positive result either the pipe or at least one of the end caps be fragmented into at least two distinct pieces, i.e., results in which the pipe is merely split or laid open or in which the pipe or caps are distorted to the point at which the caps are blown off are considered to be negative results. Although it may be argued that a small number of fragments does not indicate the development of a detonation, it at least indicates a very rapidly rising pressure which in a larger sample could lead to development of detonation.

Figure B1. Experimental arrangement for zero Gap Test

Source: U.S. Bureau of Mines, Department of the Interior

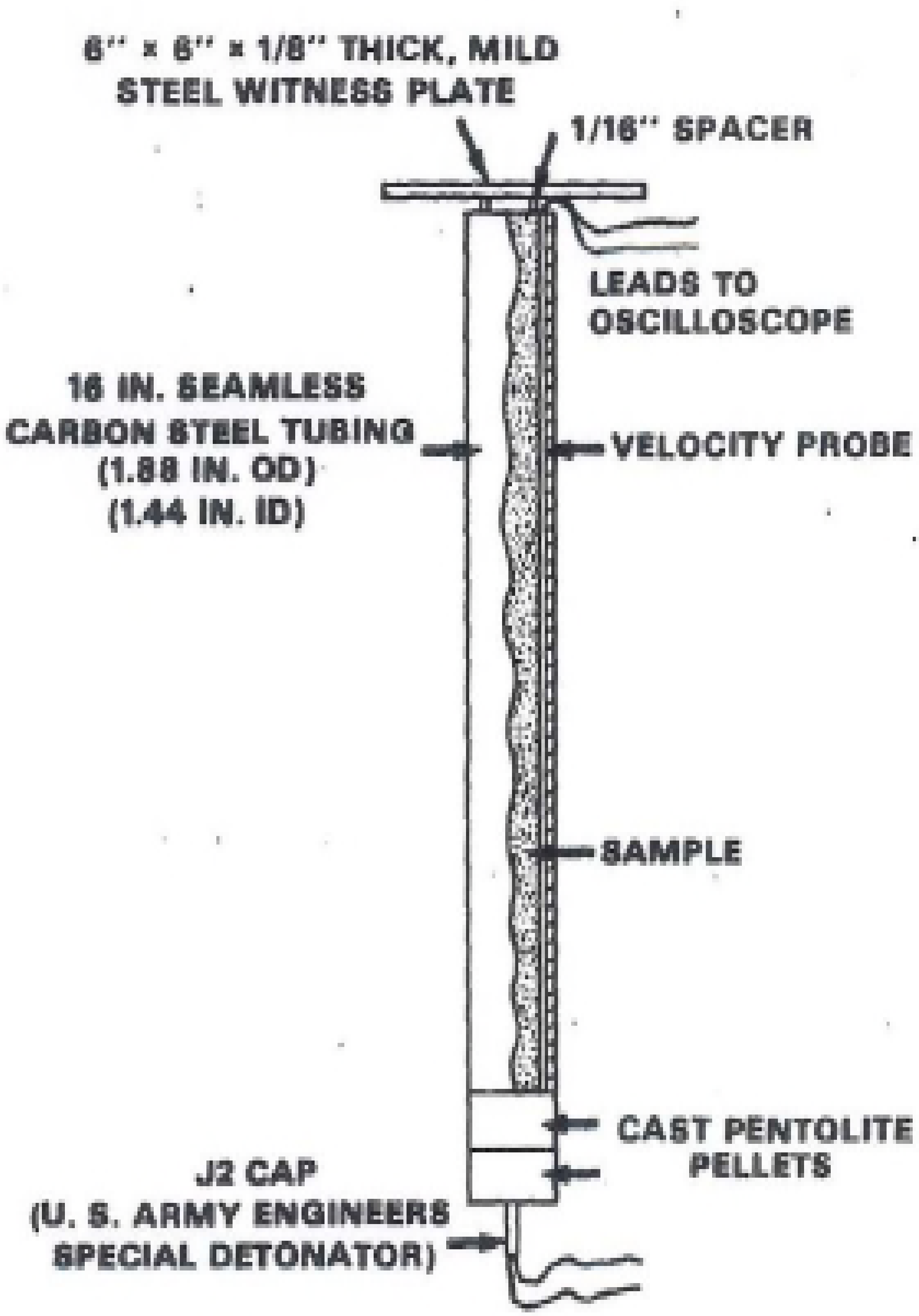
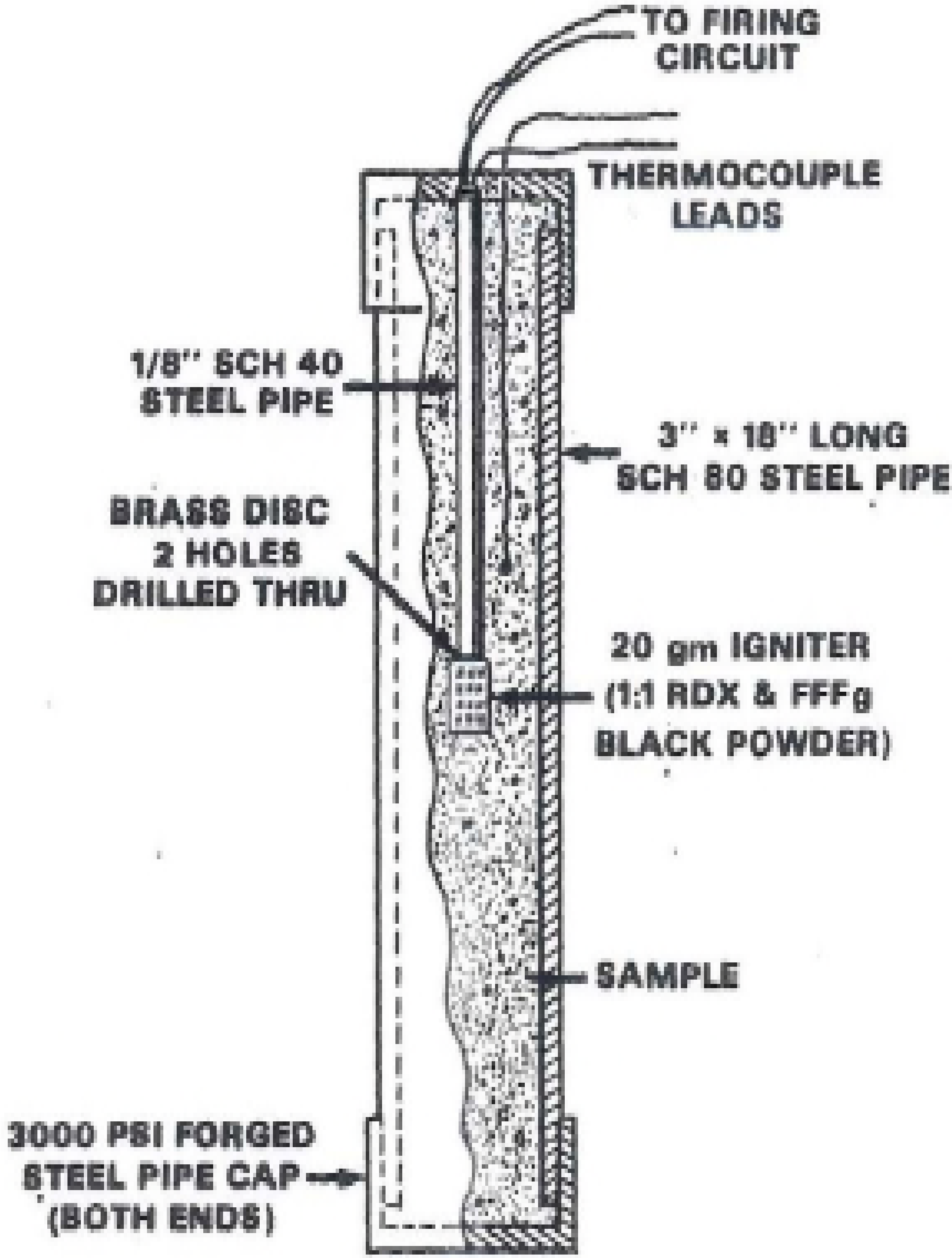


Figure B2. Experimental arrangement for deflagration-detonation transition test

Source: Hercules Incorporated (Radford Army Ammunition Plant)



Attachment II.C – Inspection Schedule

II.C.1. General Inspection Requirements

Inspections function as a preventative measure to help ensure safe operations and to identify potential problems before they can become serious problems. Inspections are performed by trained personnel to identify equipment malfunctions, structural deterioration, and leaks or discharges that could release hazardous constituents to the environment or threaten human health.

Specific inspection schedules performed for the permitted storage and treatment units under this Permit are presented in II.C.2. Additional inspections of the incinerator area are performed pursuant to 40 CFR Part 63 Subpart EEE and are not regulated by this permit pursuant to 40 CFR 264.340(b). No inspections are required under this Permit on days when waste is not being stored, treated or incinerated in the permitted treatment and storage area. In these instances, RFAAP must document this absence of waste storage and treatment in the inspection records.

All inspection results will be recorded on an inspection form by the individual who performs the inspection at the time that the inspection is performed. The individual performing the inspection will sign and date each completed inspection form. Any problem that is noted should also be noted on the Waste Propellant Area, Foreman’s Daily Log. If the foreman or operator believes that the inspection warrants immediate action to correct an identified problem, they are to stop the process and get the item repaired.

II.C.2. Inspection Schedule

Tables II.C-1 and II.C-2 present the schedule for inspection of the hazardous waste tank systems and ancillary equipment and the emergency equipment in the permitted storage and treatment area. For each item subject to inspection, the inspection schedule identifies typical problems that may be encountered during the inspection process and specifies the frequency with which the inspections are performed. The items listed in the tables are important due to their role in preventing, detecting, or responding to environmental or human health hazards.

Equipment subject to air emissions standards for equipment leaks (40 CFR Part 264, Subpart BB) are inspected as required by the facility compliance plan specified in Permit Condition III.B and described in Attachment III.A. Inspection schedules for affected equipment are also provided in Attachment III.A (see Module III). These schedules include weekly visual inspection for leaking pumps, valves, etc., and monthly to annual monitoring of the Subpart BB equipment (depending on the equipment and its designation) using USEPA Method 21.

II.C.3. Remedial Action

Should any problems or deficiencies be observed during an inspection, that observation will be recorded on the appropriate inspection form. Any necessary remedial actions will also be noted on the form and the problem or deficiency will be brought to the attention of the appropriate supervisor. When repairs or remedial actions have been completed, the date and nature of the repairs will be also recorded on the inspection form on which the problem or deficiency was originally noted.

Should any problems or deficiencies be observed that could lead to a release of hazardous waste or that could threaten personnel safety, operations will cease until the problem or deficiency is rectified. In no case will operations resume until all spill and emergency response equipment is operable and adequately stocked.

II.C.4. Inspection Recordkeeping

The trained personnel performing the inspections will record each inspection on a paper inspection form or in a computer-based program for inspections, if appropriate. These forms include, at a minimum, the potential problems identified in the inspection schedules in Tables II.C-1 and II.C-2, as well as the date, time, and person(s) performing the inspection, the specific observations that were made, any abnormalities that were found, and the date and nature of any repairs or remedial actions. Any necessary repairs resulting from the inspection are tracked through the facility's work order/preventative maintenance system. The completed inspection forms will be maintained as a part of the facility operating record for at least three years from the date of inspection.

II.C.5. Emergency Equipment

Emergency equipment used at the permitted treatment and storage area includes emergency communication equipment, fire protection equipment, and spill control equipment. This equipment is tested and maintained as necessary to assure proper operation during an emergency situation.

The emergency communications equipment in the permitted treatment and storage area includes landline telephones which are located in the control room, at each incinerator, and in the Grinder Building. These phones have direct four-digit access to each other and to other locations in the plant. Operators also carry cellular phones and/or radios with them at all times. These communication devices serve as the primary tool with which operators will notify security and the fire department of an emergency situation. From there, the RFAAP security and/or fire teams will respond to the event in compliance with the National Incident Management System (NIMS) Guidelines from the Department of Homeland Security. The highest ranking NIMS-certified official will then assume responsibility as the incident commander (IC). If the IC deems the event requires outside assistance, the IC will radio security and fire dispatch to start calling outside support and will direct them to which support (*e.g.*, fire, police, emergency medical) are necessary for the situation. Once the outside assistance arrives onsite, they will be escorted to the emergency or staging area by plant security and will respond as directed by the IC. Pursuant to NIMS directives, at no time will an operator be directly responsible for summoning outside assistance. All direction for either outside or internal assistance will be routed to the security and fire dispatch through either the landline telephones, radios, or cellular phones accessible to the operators.

In addition to the aforementioned emergency communication equipment, a horn on top of the Grinder Building provides another mechanism to alert personnel of an emergency in the permitted treatment and storage area. A button in the control room (Building 447) actuates this Grinder Building horn. This horn is intended to notify personnel in the immediate vicinity of the permitted treatment and storage area of an emergency in the area. Upon signaling of this alarm, all personnel shall evacuate the area following the evacuation routes shown in the Contingency Plan.

The buildings at the permitted treatment and storage area (Bldg. 442 and Bldg. 440/441) are also equipped with fire protection and spill control and cleanup equipment. The spill control and cleanup equipment includes items such as absorbent materials, personal protective equipment and portable pumps. Fire protection equipment includes a type ABC fire extinguisher at each incinerator, as well as air compressors, portable pumps, personal protective equipment, and lights and signs. Other available emergency equipment at the plant is listed in the Contingency Plan, Attachment II.E of this Permit.

TABLE II.C-1

INSPECTION SCHEDULE – TANKS, PIPE LOOP, AND ANCILLARY EQUIPMENT

Inspection Item	Types of Problems	Frequency of Inspection
Liquid inventory in sumps, tanks, and the control loop	Insufficient freeboard	Daily
Level sensing/control loop	Mechanical and electrical	Daily
High level alarms	Operational (Activation of Annunciator Panel)	Daily
Tank interior/exterior surfaces and support structures	Visible signs of corrosion, integrity, leaking of waste[1], potential support failure, floor bolt fasteners	Daily
Data from continuous monitoring equipment	Tanks (slurry, brine, neutralization, etc.) operating according to design	Daily
Construction materials of tank structure, support system, and ancillary equipment	Visible signs of corrosion, leakage[1], gaps, cracks, spills, presence of liquids, pathways to the environment	Daily
Area immediately surrounding tank system and secondary containment	Visible signs of corrosion, leakage[1], gaps cracks, spills, presence of liquids, pathways to the environment	Daily
Above ground piping, external and internal slurry loops	Leakage[1], wet spots, dead vegetation	Daily
Bolted flanges, joints, valves, other connections	Leakage[1]	Daily
Pumps	Visible signs of drive belt wear, excessive vibration, noise, hot bearings, dirty motor, leaking seals, low lubrication oil, damaged electrical components, broken pressure gauges, leaking pipe connections	Daily

Inspection Item	Types of Problems	Frequency of Inspection
Loading/unloading areas	Spills[1]	Daily, when in use

1. If an inspection confirms that a leak or spill has occurred from the tank system, the Permittee must notify the Department as required by 9 VAC 20-60-264; 40 CFR 264.196(d) and as specified in the Contingency Plan, Attachment II.E of this Permit. This notification is not required if the leak is less than one pound and is immediately contained and cleaned up.

TABLE II.C-2

INSPECTION SCHEDULE – EMERGENCY EQUIPMENT

Inspection Item	Types of Problems	Frequency of Inspection
Spill control equipment (*e.g.*, absorbent material, booms, *etc.)*	Out of stock	Quarterly or as used
Fire extinguishers	Seal, hose, pressure, and condition	Monthly or as used
Personal protective equipment (PPE) for fire and spill response and decontamination activities [1]	Condition of equipment	As used
Air compressors	Operational	Weekly
Portable pumps for spill response	Operational	Weekly
Internal alarm system (horn)	Operational	Daily
Communication systems	Operational	Daily

[1] PPE requirements will vary depending upon the inspection or response being performed. Examples of PPE that may be required include flame retardant coveralls, conductive or safety shoes, rubber gloves, head cover, safety glasses, hearing protection, *etc*.

Attachment II.Ca - Inspection Schedule for the EWI-CWP Complex

II.Ca.1. General Inspection Requirements

Inspections function as a preventative measure to help ensure safe operations and to identify potential problems before they can become serious problems. Inspections are performed by trained personnel to identify equipment malfunctions, structural deterioration, and leaks or discharges that could release hazardous constituents to the environment or threaten human health.

Specific inspections performed under this Permit for the regulated equipment at the EWI-CWP complex are presented in Section II.Ca.2. Additional inspections of the incinerator area are performed pursuant to 40 CFR Part 63 Subpart EEE and are not regulated by this permit pursuant to 40 CFR 264.340(b). No inspections are required for individual systems at the EWI-CWP complex and covered under this Permit and addressed in Tables II.Ca-1 through II.Ca-6 on days when waste is not being stored or treated in the respective system within the complex (*e.g.*, grinder system, rotary kiln incinerators, CBC system). In these instances, RFAAP must document this absence of waste storage and treatment in the inspection records.

All inspection results will be recorded on an inspection form by the individual who performs the inspection at the time that the inspection is performed. The individual performing the inspection will sign and date each completed inspection form. Any problem that is found should also be noted in the unit operating record. If the foreman or operator believes that the inspection warrants immediate action to correct an identified problem, they are to stop the process and get the item repaired.

II.Ca.2. Inspection Schedule

Table II.Ca-1 through Table II.Ca-6 present the schedule for inspection of the hazardous waste management units and the emergency equipment at the EWI-CWP complex. For each item subject to inspection, the inspection schedule identifies typical problems that may be encountered during the inspection process and specifies the frequency with which the inspections are performed. The items listed in the tables are important due to their role in preventing, detecting, or responding to environmental or human health hazards.

That equipment subject to air emissions standards for equipment leaks (40 CFR Part 264, Subpart BB) is inspected as required by the facility compliance plan specified in Permit Condition III.B and described in Attachment III.Aa. Inspection schedules for the affected equipment is provided in Attachment III.Aa (see Module III) and is not repeated herein.

II.Ca.3. Remedial Actions

Should any problems or deficiencies be observed during an inspection, that observation will be recorded on the appropriate inspection form. Any necessary remedial actions will also be noted on the form and the problem or deficiency will be brought to the attention of the appropriate supervisor. When repairs or remedial actions have been completed, the date and nature of the repairs will be also recorded on the inspection form on which the problem or deficiency was originally noted.

Should any problems or deficiencies be observed that could lead to a release of hazardous waste or that could threaten personnel safety, operations will cease until the problem or deficiency is rectified. In no case will operations resume until all spill and emergency response equipment is operable and adequately stocked.

II.Ca.4. Inspection Recordkeeping

The trained personnel performing the inspections will record each inspection on a paper inspection form or in a computer-based program for inspections, if appropriate. These forms include, at a minimum, the potential problems identified in the inspection schedules in Table II.Ca-1 through Table II.Ca-6, as well as the date, time, and person(s) performing the inspection, the specific observations that were made, any abnormalities that were found, and the date and nature of any repairs or remedial actions. The completed inspection forms will be maintained as a part of the facility operating record for at least three years from the date of inspection.

II.Ca.5. Emergency Equipment

Emergency equipment used at the EWI-CWP complex includes the following:

- Emergency communication equipment, including landline telephones, cellular telephones, radios, and an internal alarm system;

- Safety showers and eyewashes, provided pursuant to OSHA requirements throughout the complex;

- Fire extinguishing and suppression equipment including a combination of fire extinguishers, dry-pipe and wet-pipe systems, and deluge systems throughout the complex;

- Spill control equipment, including items such as absorbent material, booms, *etc*.; and

- Personal protective equipment (PPE), such as flame-retardant coveralls, conductive or safety shoes, rubber gloves, head cover, safety glasses, hearing protection, *etc*.

This equipment is tested and maintained as specified in Table II.Ca-6 to ensure proper operation during an emergency situation. Detailed information on the specific emergency equipment provided within each building of the EWI-CWP complex is provided in the Contingency Plan in Attachment II.Ea.

Table II.Ca-1 - Inspection Schedule – Grinder Building

Inspection Item	Types of Problems	Frequency of Inspection
Bucket conveyor	Visual inspection for wear or damage of conveyor system and check for accumulated debris or signs of unusual wear	Daily
	Check for proper lubrication, packing, and motor alignment	Monthly
Metal detector	Visual operational check to confirm proper operation and check for excessive vibration and noise	Daily
	Sensitivity check	Weekly
Grinder equipment (grinder and cutter)	Visual inspection for leaks, spills, corrosion, wear, weld breaks, and other damage	Daily
	Visual inspection of motors and bearings for proper lubrication, material buildup, signs of damage, and proper alignment	Monthly
	Replacement of gear and buffer oil and lubrication of all motors and bearings as necessary	Annually
	Vibrational testing on all rotating equipment not equipped with continuous vibration monitors	Annually
All regulatory required instrumentation	Calibration check or full calibration	Per manufacturer recommendations

Table II.Ca-2 - Inspection Schedule – Combustion Systems (Kiln 1 and 2)

Inspection Item	Types of Problems	Frequency of Inspection
Outer shell of each piece of equipment	Visual inspection for fugitive emissions, corrosion, hot spots, weld breaks, or holes, or other signs of damage	Daily
Inner compartments of each piece of equipment	Visual inspection for corrosion, erosion, hot spots, weld breaks, or holes, or other signs of damage	Annually
Kiln	Visual inspection of the refractory lining for cracking, missing bricks, or unusual wear	Quarterly
	Visual inspection of the waste injection system for signs of thermal or mechanical deterioration or deformation, or other signs of damage	Semiannually
	Visual inspection of the feed and discharge hoods for material buildup and signs of damage (metal and/or brick pieces, corrosion, fractures, *etc.*)	Semiannually
	Check/measurement of the ovality and slope of the kiln	Annually
	Visual inspection of the ash discharge for material buildup and signs of damage (metal and/or brick pieces, corrosion, fractures, *etc.*)	Semiannually
Kiln seal system	Visual inspection for fugitive emissions, proper alignment and installation, signs of damage, or material escape	Weekly
Kiln rotational system	Visual inspection for adequate lubrication, signs of damage, uneven or unusual wear, metal shavings, or other signs of damage	Daily

Inspection Item	Types of Problems	Frequency of Inspection
	Lubrication of the system components and drive vibration analysis	Monthly
	Visual inspection of all components of the drive system, including gears, bearings, rollers, tires, and couplings	Quarterly
Kiln rotational system (cont'd)	Check/measurement of the tire position relative to the stop blocks. Confirmation of proper concentric rotation of the kiln, checking for wobbling or other unusual movement. Cleaning and lubrication of all system components and resurfacing of rollers if necessary	Annually
Secondary combustion chamber	Visual inspection of the refractory lining for cracking, or unusual wear	Quarterly
Burner systems	Visual inspection of pilot and burner assemblies for mineral or corrosion buildup and proper linkage connections	Weekly
	Check of the fuel supply pressure and check of the flame detector for proper operation	Monthly
	Visual inspection of flame pattern, refractory components, electrical terminals, and valve operation	Annually
	Burner management system test per latest edition of NFPA 86	
Combustion air blowers	Visual inspection to confirm proper operation and check for excessive vibration, noise, accumulated debris, or signs of unusual wear	Daily

Inspection Item	Types of Problems	Frequency of Inspection
	Visual inspection of air inlet for adequate opening and shaft seals for adequate sealing	Monthly
	Visual inspection of blower internals, cleaning blades as necessary, checking for excessive buildup, corrosion, erosion, and other signs of damage	Annually
Combustion air blowers (cont'd)	Vibrational testing on all rotating equipment not equipped with continuous vibration monitors. Confirmation of proper voltage supply and regulation.	Annually
All regulatory required instrumentation	Calibration check or full calibration	Annually or per manufacturer recommendations

Table II.Ca-3 - Contained Burn Chamber System

Inspection Item	Types of Problems	Frequency of Inspection
Outer shell of each piece of equipment	Visual inspection for fugitive emissions, corrosion, hot spots, weld breaks, or holes, or other signs of damage	Daily
Inner compartments of each piece of equipment	Visual inspection for corrosion, erosion, hot spots, weld breaks, or holes, or other signs of damage	Annually
CBC door	Visual inspection of door locking mechanism and compressed air system for door lock	Daily
CBC pressure relief valve	Operational check	Annually
Afterburner	Visual inspection of the refractory lining for cracking, or unusual wear	Quarterly
Trolley system	Visual inspection for hazardous waste spills, signs of damage, and debris or obstructions on the tracks	Daily
	Visual inspection of hydraulic and cooling water systems for leaking fluids, broken seals, or loose connections	
	Visual inspection of tracks for proper alignment and connection	Annually
Burner systems	Visual inspection of pilot and burner assemblies for mineral or corrosion buildup and proper linkage connections	Weekly
	Check of the fuel supply pressure and check of the flame detector for proper operation	Monthly
	Visual inspection of flame pattern, refractory components, electrical terminals, and valve operation	Annually

Inspection Item	Types of Problems	Frequency of Inspection
Burner systems (cont’d)	Burner management system test per latest edition of NFPA 86	
Combustion air blowers	Visual inspection to confirm proper operation and check for excessive vibration, noise, accumulated debris, or signs of unusual wear	Daily
	Visual inspection of air inlet for adequate opening and of belts and packing glands for proper tension and lubrication	Monthly
	Visual inspection of blower internals, cleaning blades as necessary, checking for excessive buildup, corrosion, erosion, and other signs of damage	Annually
	Vibrational testing on all rotating equipment not equipped with continuous vibration monitors. Confirmation of proper voltage supply and regulation.	Annually
Regulatory and safety process instrumentation	Calibration check or full calibration	Per manufacturer recommendations

Table II.Ca-4
Inspection Schedule – Air Pollution Control System

Inspection Item	Types of Problems	Frequency of Inspection
Outer shell of each piece of equipment	Visual inspection for fugitive emissions, corrosion, weld breaks, or holes, or other signs of damage	Daily
Inner compartments of each piece of equipment	Visual inspection for corrosion, erosion, hot spots, weld breaks, or holes, or other signs of damage	Annually
Evaporative cooler	Visual inspection for leaks in piping or connections	Daily
	Confirmation of proper operation of the spray nozzles and appropriate water distribution	Monthly
Baghouse	Visual inspection of penthouse area for irregular bag seating or leaks	Weekly
	Leak test of the bags, injecting dust and looking for dust on the clean side of the bags (in the penthouse)	Quarterly
	Inspection of installed bags for obvious holes, cuts, wear, saturation, mud-like material, or excessive buildup	Annually
Baghouse pulsing system	Visual inspection for leaks in piping or connections and to confirm adequate air pressure and proper operation	Weekly
	Verification of proper sequencing of the bag pulsing system	Quarterly
	Replacement of all high-wear parts	Annually

Inspection Item	Types of Problems	Frequency of Inspection
Baghouse discharge hopper	Visual inspection to confirm dust discharge (no plugs) and proper connection of drum to hopper, and to make sure vibrators and hopper heaters are working	Daily

Inspection Item	Types of Problems	Frequency of Inspection
Baghouse bypass system	Operational check (mechanical activation and alarm activation)	Daily
	Clean out of accumulated ash and leak test of bypass valve, injecting dust and looking for dust on the clean side of the valve and around the seating area of the valve	Quarterly
Selective catalytic reducer (SCR)	Collection of a catalyst coupon to evaluate catalyst activity, and check of gas-side pressure drop across the catalyst to check for buildup	Quarterly
	Evaluation/calibration of ammonia and air mixing skid for proper mixing ratios	
SCR ammonia distribution and storage system	Operational check of release detection and alarm system, visual inspection of secondary containment system, and mechanical checks of all pumps	Monthly
	Visual inspection of pipeline and foundations for signs of leaks, cracks, or other types of damage. Operational test of electric heat tracing system, if utilized.	Annually
	External inspection and thickness testing of tanks	Annually
	Operational checks of pressure relief system.	Annually
	Internal inspection and thickness testing of tanks	Every 5 years
SCR burner system	Visual inspection of pilot and burner assemblies for mineral or corrosion buildup and proper linkage connections	Weekly

Inspection Item	Types of Problems	Frequency of Inspection
	Check of fuel supply pressure and flame detector operation	Monthly
SCR burner system (cont'd)	Visual inspection of flame pattern, refractory components, electrical terminals, and valve operation	Annually
	Burner management system test per latest edition of NFPA 86	
SCR combustion air blower	Visual inspection to confirm proper operation and check for excessive vibration, noise, accumulated debris, or signs of unusual wear	Daily
	Visual inspection of air inlet for adequate opening and of belts and packing glands for proper tension and leakage	Monthly
	Visual inspection of blower internals, cleaning blades as necessary, checking for excessive buildup, corrosion, erosion, and other signs of damage	Annually
	Perform vibrational testing on all rotating equipment not equipped with continuous vibration monitors. Confirm proper voltage supply and regulation.	Annually
Adiabatic quench	Visual inspection for leaks in piping or connections	Daily
	Confirmation of proper operation of the spray nozzles and appropriate water distribution	Quarterly
Packed bed scrubber	Visual inspection for leaks in piping or connections	Daily

Inspection Item	Types of Problems	Frequency of Inspection
	Confirmation of proper operation of the spray nozzles and appropriate water distribution	Quarterly
	Visual inspection of mist eliminators and packing for accumulation of sludge, scale, or slime and proper structural support	Annually
Induced draft fan	Visual inspection to confirm proper operation and check for excessive vibration, noise, accumulated debris, or signs of unusual wear	Daily
	Visual inspection of blower internals, cleaning blades as necessary, checking for excessive buildup, corrosion, erosion, and other signs of damage	Annually
	Vibrational testing on all rotating equipment not equipped with continuous vibration monitors. Confirmation of proper voltage supply and regulation.	Annually
All regulatory instrumentation	Calibration check or full calibration	Per manufacturer recommendations
Continuous emissions monitoring equipment	Calibration verification and visual inspection of all system components	Daily
	Leak test of sampling system and absolute calibration audit	Quarterly (except in a quarter in which a RATA is performed)
	Relative accuracy test audit	Annually

Table II.Ca-5
Inspection Schedule – Tanks, Pipe Loops, And Ancillary Equipment

Inspection Item	Types of Problems	Frequency of Inspection
Loading/unloading areas	Visual inspection for spills [1]	Daily, when in use
Liquid inventory in tanks and the control loop	Visual inspection for sufficient freeboard or indication of leaks [1]	Daily
Tanks and support structures	Visual external inspection for corrosion, integrity, other signs of damage, or leaking of waste [1]	Daily
	Visual internal inspection for corrosion, integrity, other signs of damage, or leaking of waste [1]	Semiannually
Above ground hazardous waste piping and all associated flanges, joints, valves, and other connections	Visual inspection for leakage [1], wet spots, other visual signs of leaks from piping	Daily
Air compressors and receivers	Visual inspection and operational check	Weekly
Sumps and secondary containment systems (throughout complex)	Visual inspection of sump level	Daily
Pumps (throughout complex)	Visual inspection to confirm proper operation and check for excessive vibration, noise, accumulated debris, or signs of unusual wear	Daily
	Check for proper lubrication, packing, and motor alignment	Monthly
All regulatory required instrumentation	Calibration check or full calibration	Per manufacturer recommendations
Emergency generator	Visual inspection of oil levels and other system components and operational check	Weekly
	Operational check of generator and switching controls	Monthly

[1] If an inspection confirms that a leak or spill has occurred from the tank system, the Permittee must notify the Department as required by 9 VAC 20-60-264; 40 CFR §264.196(d) and as specified in the Contingency Plan, Attachment II.E of this Permit. This notification is not required if the leak is less than one pound and is immediately contained and cleaned up.

Table II.Ca-6
Inspection Schedule – Emergency Equipment

Inspection Item	Types of Problems	Frequency of Inspection
Communication systems	Operational check	Daily
Internal alarm system	Operational check	Daily
Safety showers and eyewashes	Operational check	Weekly
Fire extinguishers	Check of seal, hose, pressure, and condition	Monthly or as used
Fire suppression equipment	Visual inspection – gauges	Weekly (dry, pre-action and deluge systems)
		Monthly (wet-pipe system)
	Visual inspection – alarm devices and signal devices	Quarterly
	Operational check	Monthly (water fog/halo systems)
		Semiannually (vane and pressure type devices)
Spill control equipment (*e.g.*, absorbent material, booms, *etc.)*	Out of stock	Quarterly or as used
Portable pumps for spill response	Operational check	Weekly
Air compressors	Operational check	Weekly
Personal protective equipment (PPE) for fire and spill response and decontamination activities [1]	Condition of equipment	As used

[1] PPE requirements will vary depending upon the inspection or response being performed. Examples of PPE that may be required include flame retardant coveralls, conductive or safety shoes, rubber gloves, head cover, safety glasses, hearing protection, *etc*.

Attachment II.D – Personnel Training

II.D.1. Appropriate training shall be completed by all persons at RAAP who are or may be involved in a task associated with the permitted storage and treatment areas. The Permittee shall insure that those individuals responsible operating and inspecting the permitted systems are appropriately trained. New employees who have as part of their job responsibility tasks that are associated with or may be associated with the permitted storage and treatment area shall not work unsupervised until the training required in accordance with this permit is completed. Such new employees shall complete the required training within six months of their employment date.

II.D.2. All training of personnel shall be documented at the time of each completed session and such documentation shall be maintained in the facility operating log for at least three years from the date on which the training was completed. Such documentation shall include the name of each trainee and trainer, date of instruction, and a summary or outline of the training session.

II.D.3. All training under this permit shall be reviewed at least annually and updated as necessary. All personnel who are subject to the training requirements under this permit shall be required to review their training at least annually.

II.D.4. In general, all personnel who are actively associated with or may be associated with the proper operation, inspection, and maintenance of the permitted storage and treatment areas are required to read the standard operating or maintenance procedure for the incinerator area and those pertaining to emergency response that are associated with the Contingency Plan. In addition, the personnel shall be trained to properly perform their assigned duties including, but not limited to, operating the storage tanks and incinerators and conducting inspections as required by this Permit.

II.D.5. The personnel noted above shall be required under this permit to fully understand the techniques of proper maintenance and operation and maintain appropriate documentation required under this permit. Supervisory staff shall be trained to review and to provide appropriate guidance and/or liaison with the Permittee' management. The Permittee shall provide sufficient opportunity for personnel to acquire a full understanding of maintenance and operation techniques by providing sufficient instruction and/or sponsoring sufficient instruction by professionals who are qualified to provide such instruction.

II.D.6. All personnel employed by the operating contractor who are or may be exposed to the hazards associated with the permitted storage and treatment operations shall receive general plant orientation and training in area-specific procedures.

Employees then receive on-the-job training in all of the procedures that specifically pertain to their area of employment.

II.D.7. The personnel involved in the actual operation of the permitted storage and treatment area will be trained in the proper procedures for operation of the incinerators and storage tank system. These procedures have been designed to ensure continued safe operation and maintenance and compliance with applicable environmental regulations. This includes training required to properly operate and maintain the Burn Validator program used track the waste being fed into the incinerator units to ensure compliance with the feed-rate composition and emission limits.

II.D.8. The facility operating contractor will be responsible for the overall training program, scheduling and documentation of such training and shall serve as the RCRA Training Director.

II.D.9. All personnel required under this permit to receive training shall at minimum be instructed in the following areas:

a. Area specific management practices regarding the permitted storage and treatment area;

b. Security and safety;

c. General and area specific inspections and recordkeeping;

d. Regulatory updates that affect operations and activities; and

e. Job function and procedural descriptions of each employee’s respective role in the permitted storage and treatment operations.

II.D.10. A complete outline of the training program is provided in Appendix II.D-1.

II.D.11. Job titles and descriptions for personnel involved in the permitted storage and treatment operations are summarized in Table II.D-1. These job titles and the name of the current person filling that position are kept on file at the RFAAP.

TABLE II.D-1 – JOB TITLES AND RESPONSIBILITIES [1]

Job Title	Job Description	Training Required
RCRA Compliance Coordinator	Responsible for overall administration of hazardous waste management program as directed by the US Army under the terms of the operating contract for the installation.	Trained in all aspects of hazardous waste management.
Emergency Response Coordinator	Assist in preparation and presentation of training program, maintain pre-fire plan for the area, and respond to fire alarms.	Trained in hazardous waste emergency procedures.
Firemen	Respond to hazardous waste emergencies.	Trained in all aspects of hazardous waste emergency response. Training conducted with regular fire training and not hazardous waste program.
Medical Staff	Responds to all health emergencies.	Trained in emergency medical procedures.
Safety Manager	Provide health, safety and toxicological data on handling hazardous materials.	Occasional training program to keep current.
Production Technologist	Conduct weekly inside building inspections, supervise hazardous waste handling operations at HWM facility, and supervise minor spill cleanup. Responsible for on-the-job training of employees.	Trained in hazardous waste handling procedures, including chemical hazards, personnel protection, and explosive reactions.
Waste Propellant Facility Operators	Responsible for incinerator control room, coordinating maintenance activities, and performing inspections. Unloading, placing, and loading of hazardous wastes at a HWM facility.	Trained in hazardous waste handling procedures, including chemical hazards, personnel protection, and explosive reactions.
Waste Handlers	Responsible for managing wastes stored in temporary (less than 90 day) storage areas throughout the RFAAP, and, when necessary, transferring wastes from those storage areas to the EWI area	Trained in proper hazardous waste handling and management procedures
Environmental Manager	Functions as alternate to RCRA Coordinator. Responsible for overall plant environmental management.	Trained in all aspects of manufacturing and hazardous waste disposal operations.

[1] Names of individuals fulfilling this positions are withheld to protect National security in accordance with Department of Defense (DoD) Directive 5400.11-R, Office of Management and Budget (OMB) Memorandum M-07-16, and Army Regulation 340-21. These names are available for review and inspection upon request.

Appendix II.D-1

OUTLINE OF TRAINING PROGRAM

Appendix II.D-1 - Outline of Training Program

1. Personnel Training

The purpose of the introductory and continuing hazardous waste training program is to educate the employees who are responsible for handling hazardous wastes and any permit related tasks. The program makes known to the employee the hazards of those wastes and the proper procedures to follow in the event of an emergency. The employee training has been and will be completed through formal classes, electronic training, and/or through on-the-job training administered by the Training Department or a qualified contractor.

2. Overview of the Training Program

The training program at the facility consists of a general orientation, instruction for area-specific procedures, on-the-job training, and a general and continuing training program. To satisfy the requirements of 40 CFR § 264.16(a)(3), the following topics are addressed:

- Procedures for using, inspecting, repairing, and replacing facility emergency and monitoring equipment;
- Key parameters for automatic waste feed cut-off systems;
- Communications and alarm systems;
- Response procedures for fires and explosions;
- Response procedures to groundwater contamination incidents; and
- Procedures for shutdown of operations.

3. Training Content, Frequency, and Techniques

Introductory training for all facility employees consists of a general orientation that is provided by the facility training department. Training in operating procedures is given on-the-job by area supervision. The operating procedures cover subjects such as cleaning equipment and materials, operating equipment and materials, safety rules and precautions, and a step-by-step description of the designated task. Appropriate changes in facility operating procedures are implemented as a result of training.

Facility personnel have or will successfully complete the required training program within six (6) months after the effective date of their employment or assignment to the permitted storage and treatment area, or to a new position at the permitted storage and treatment area, whichever is later. Employees will not work in unsupervised positions until they have completed the training requirements described in this section.

4. RCRA Compliance Coordinator

The RCRA Compliance Coordinator conducts or oversees all hazardous waste management training and maintenance of personnel training records. The responsibilities for this position include compiling the hazardous waste biennial report, notifying health, safety, security, operations, and fire departments of changes in facility status, and reviewing operating procedures.

5. Training Records

Training records are maintained for all facility employees by the training department. Training records of all employees involved with hazardous waste management will be reviewed annually in order to ensure that employee training is current and that appropriate and relevant training is coordinated with employee job functions.

Current training records of employees involved with hazardous waste management and former employees will be kept as required by this Permit.

6. Training for Emergency Response

The training program at RFAAP includes on-the-job training to cover effective response to emergencies. Additionally, it is imperative that adequate fire prevention and protection is provided by the facility's fire department due to the reactive wastes at the facility.

The Fire Prevention and Protection Training Program includes drills, exercises, and hands-on training sessions. Each fireman receives minimum of four hours training each week. A training schedule is prepared and a training record is maintained on each fireman and retained in the fire station. New firemen receive formal and on-the-job training and respond with the fire company to all fires. The basic training period usually covers at least 18 months depending on prior qualification and experience of the new fireman.

Training of other employees is conducted during drills and safety meetings. Fire department personnel are available to other people on request to conduct classes, demonstrations and drills.

7. Implementation of the Training Program

There exists at RFAAP, an extensive system and computer program to ensure that required on-the-job training has been conducted with each employee. This program is administered and maintained by the Training Department.

Based on the job title/description, each employee is assigned two sets of training programs and procedures. The first set is a general plant training set that each new employee gets and the second set of training is an area and job specific set. These training sets have a deadline by which they have to be completed. On-the-job training and area specific procedure training is usually performed by the employee's foreman/supervisor. When the training is complete, the foreman/supervisor and employee verify the training with a sign-off sheet.

When a new employee is hired or assigned to a new area, the training department reviews the internal training matrix for that job category. That matrix and the requirements for completing it (*e.g.* timeframe, courses required, *etc*.) are entered into the facility's training database. That database sends the employee, their supervisor, and the training department, notifications for all training that must be performed for their specific job and the timeframe in which it must be performed. In certain instances, the Training Department's representative will intervene with specific hardcopy training documentation and/or certifications. This is dependent on the specialization required in the new position. This database not only tracks the required new-hire training, but also tracks the recertification requirements for each employee anytime work instructions for a particular job and/or task are revised or updated. This system is designed to help ensure that new or transferred employees do not work on a job task or in an area without first receiving the required training for that task or area.

Attachment II.Da - Personnel Training for the EWI-CWP Complex

II.Da.1. Appropriate training shall be completed by all persons at RFAAP who are or may be involved in a task associated with the EWI-CWP complex. The Permittee shall insure that those individuals responsible operating and inspecting the permitted systems are appropriately trained. New employees who have as part of their job responsibility tasks that are associated with or may be associated with the EWI-CWP complex shall not work unsupervised until the training required in accordance with this permit is completed. Such new employees shall complete the required training within six months of their employment date.

II.Da.2. All training of personnel shall be documented at the time of each completed session and such documentation shall be maintained in the facility operating log until closure of the facility. When an employee leaves the installation, their training records must be maintained for at least three years from the date on which the employee last worked at the facility. Such documentation shall include the name of each trainee and trainer, date of instruction, and a summary or outline of the training session.

II.Da.3. All training under this permit shall be reviewed at least annually and updated as necessary. All personnel who are subject to the training requirements under this permit shall be required to review their training at least annually.

II.Da.4. In general, all personnel who are actively associated with or may be associated with the proper operation, inspection, and maintenance of the EWI-CWP complex are required to read the standard operating or maintenance procedure for the area and those pertaining to emergency response that are associated with the Contingency Plan. In addition, the personnel shall be trained to properly perform their assigned duties and conduct inspections of equipment in the EWI-CWP complex including, but not limited to, operating the grinder system, the permitted tanks, the CBC transfer system, the rotary kiln incinerators and the CBC, and all associated equipment.

II.Da.5. The personnel noted above shall be required under this Permit to fully understand the techniques of proper maintenance and operation and maintain appropriate documentation required under this permit. Supervisory staff shall be trained to review and to provide appropriate guidance and/or liaison with the Permittee' management. The Permittee shall provide sufficient opportunity for personnel to acquire a full understanding of maintenance and operation techniques by providing sufficient instruction and/or sponsoring sufficient instruction by professionals who are qualified to provide such instruction.

II.Da.6. All personnel employed by the operating contractor who are or may be exposed to the hazards associated with the operations at the EWI-CWP complex shall receive a general plant orientation and training in area-specific procedures. Employees then receive on-the-job training in all of the procedures that specifically pertain to their area of employment.

II.Da.7. The personnel involved in the actual operation of the EWI-CWP complex will be trained in the proper procedures for operation of the permitted equipment located therein. These procedures have been designed to ensure continued safe operation and maintenance and compliance with applicable environmental regulations.

II.Da.8. The facility operating contractor will be responsible for the overall training program, scheduling and documentation of such training, and shall serve as the RCRA Training Director.

II.Da.9. All personnel required under this permit to receive training shall at minimum be instructed in the following areas:

a. Area specific management practices regarding the EWI-CWP complex;

b. Security and safety;

c. General and area specific inspections and recordkeeping;

d. Regulatory updates that affect operations and activities; and

e. Job function and procedural descriptions of each employee’s respective role in the operations at the EWI-CWP complex.

A complete outline of the training program is provided in Appendix II.Da-1.

II.Da.10. Job titles and descriptions for personnel involved in the operations at the EWI-CWP complex are summarized in Table II.Da-1. These job titles and the name of the current person filling that position are kept on file at the RFAAP.

Table II.Da-1 - Job Titles and Responsibilities [1]

Job Title	Job Description	Training Required
RCRA Compliance Coordinator	Responsible for overall administration of hazardous waste management program as directed by the US Army under the terms of the operating contract for the installation.	Trained in all aspects of hazardous waste management.
Emergency Response Coordinator	Assist in preparation and presentation of training program, maintain pre-fire plan for the area, and respond to fire alarms.	Trained in hazardous waste emergency procedures.
Firemen	Respond to hazardous waste emergencies.	Trained in all aspects of hazardous waste emergency response. Training conducted with regular fire training and not hazardous waste program.
Medical Staff	Responds to all health emergencies.	Trained in emergency medical procedures.
Safety Manager	Provide health, safety and toxicological data on handling hazardous materials.	Occasional training program to keep current.
Production Technologist	Conduct weekly inside building inspections, supervise hazardous waste handling operations at HWM facility, and supervise minor spill cleanup. Responsible for on-the-job training of employees.	Trained in hazardous waste handling procedures, including chemical hazards, personnel protection, and explosive reactions.
Waste Propellant Facility Operators	Responsible for incinerator control room, coordinating maintenance activities, and performing inspections. Unloading, placing, and loading of hazardous wastes at a HWM facility.	Trained in hazardous waste handling procedures, including chemical hazards, personnel protection, and explosive reactions.
Waste Handlers	Responsible for managing wastes stored in temporary (less than 90 day) storage areas throughout the RFAAP, and, when necessary, transferring wastes from those storage areas to the EWI area	Trained in proper hazardous waste handling and management procedures
Environmental Manager	Functions as alternate to RCRA Coordinator. Responsible for overall plant environmental management.	Trained in all aspects of manufacturing and hazardous waste disposal operations.

[1] Names of individuals fulfilling these positions are withheld to protect National security in accordance with Department of Defense (DoD) Directive 5400.11-R, Office of Management and Budget (OMB) Memorandum M-07-16, and Army Regulation 340-21. These names are available for review and inspection upon request.

Appendix II.Da-1

Outline of Training Program

Appendix II.Da-1 - Outline of Training Program

1. Personnel Training

The purpose of the introductory and continuing hazardous waste training program is to educate the employees who are responsible for handling hazardous wastes and any permit related tasks. The program makes known to the employee the hazards of those wastes and the proper procedures to follow in the event of an emergency. The employee training has been and will be completed through formal classes, electronic training, and/or through on-the-job training administered by the Training Department or a qualified contractor.

2. Overview of the Training Program

The training program at the facility consists of a general orientation, instruction for area-specific procedures, on-the-job training, and a general and continuing training program. To satisfy the requirements of 40 CFR §264.16(a)(3), the following topics are addressed:

- Procedures for using, inspecting, repairing, and replacing facility emergency and monitoring equipment;
- Key parameters for automatic waste feed cut-off systems;
- Communications and alarm systems;
- Response procedures for fires and explosions;
- Response procedures to groundwater contamination incidents; and
- Procedures for shutdown of operations.

3. Training Content, Frequency and Techniques

Introductory training for all facility employees consists of a general orientation that is provided by the facility training department. Training in operating procedures is given on-the-job by area supervision. The operating procedures cover subjects such as cleaning equipment and materials, operating equipment and materials, safety rules and precautions, and a step-by-step description of the designated task. Appropriate changes in facility operating procedures are implemented as a result of training.

Facility personnel have or will successfully complete the required training program within six (6) months after the effective date of their employment or assignment to the EWI-CWP complex, or to a new position at the EWI-CWP complex, whichever is later. Employees will not work in unsupervised positions until they have completed the training requirements described in this section.

4. RCRA Compliance Coordinator

The RCRA Compliance Coordinator conducts or oversees all hazardous waste management training and maintenance of personnel training records. The responsibilities for this position include compiling the hazardous waste biennial report, notifying health, safety, security, operations, and fire departments of changes in facility status, and reviewing operating procedures.

5. Training Records

Training records are maintained for all facility employees by the training department. Training records of all employees involved with hazardous waste management will be reviewed annually in order to ensure that employee training is current and that appropriate and relevant training is coordinated with employee job functions.

Current training records of employees involved with hazardous waste management and former employees will be kept as required by this Permit.

6. Training for Emergency Response

The training program at RFAAP includes on-the-job training to cover effective response to emergencies. Additionally, it is imperative that adequate fire prevention and protection is provided by the facility's fire department due to the reactive wastes at the facility.

The Fire Prevention and Protection Training Program includes drills, exercises, and hands-on training sessions. Each fireman receives a minimum of four hours training each week. A training schedule is prepared and a training record is maintained on each fireman and retained at the fire station. New firemen receive formal and on-the-job training and respond with the fire company to all fires. The basic training period usually covers at least 18 months depending on prior qualification and experience of the new fireman.

Training of other employees is conducted during drills and safety meetings. Fire department personnel are available to other people on request to conduct classes, demonstrations and drills.

7. Implementation of the Training Program

There exists at RFAAP an extensive system to ensure that required on-the-job training has been conducted with each employee. This system is managed via a

computer program and is administered and maintained by the Training Department.
Based on the job title/description, each employee is assigned two sets of training programs and procedures. The first set is a general plant training set that each new employee completes and the second set of training is an area and job specific set. These training sets have a deadline by which they have to be completed. On-the-job training and area specific procedure training is usually performed by the employee’s foreman/supervisor. When the training is complete, the foreman/supervisor and employee verify the training with a sign-off sheet.

When a new employee is hired or assigned to a new area, the training department reviews the internal training matrix for that job category. That matrix and the requirements for completing it (*e.g.* timeframe, courses required) are entered into the facility's training database. That database sends the employee, their supervisor, and the training department, notifications for all training that must be performed for their specific job and the timeframe in which it must be performed. In certain instances, the Training Department’s representative will intervene with specific hardcopy training documentation and/or certifications. This is dependent on the specialization required in the new position. This database not only tracks the required new-hire training, but also tracks the recertification requirements for each employee anytime work instructions for a particular job and/or task are revised or updated. This system is designed to help ensure that new or transferred employees do not work on a job task or in an area without first receiving the required training for that task or area.

Attachment II.E – Contingency Plan

II.E.1. Introduction and General Information

This Contingency Plan (Plan) has been prepared pursuant to 40 CFR § 270.14(b)(7) for the hazardous waste incinerators and the permitted hazardous waste storage tanks (herein referred to as the Incinerator) at the Radford Army Ammunition Plant (RFAAP). This information provided herein is also applicable to the less than 90 day hazardous energetic waste accumulation areas, as the materials stored at these locations are the same as those stored and treated in the permitted units covered by this Permit.

The list of less than 90 day accumulation areas will be maintained on-site in the operating record per Condition II.J.2.d.x. The list of accumulation areas is dynamic and subject to change as waste generation and management needs warrant. Additional less than 90 day accumulation areas may be established in accordance with 9 VAC 20-60-262.B.4 and without modification of this Permit).

This Plan has been compiled as a stand-alone document for the permitted treatment and storage area and has been structured to be consistent with other plans and procedures in use at the RFAAP.

II.E.1.a. Purpose

In accordance with 40 CFR §§ 264.50 through 264.56, this document describes the Contingency Plan that will be activated in the event of a fire, explosion, or release of hazardous waste or hazardous waste constituents that could threaten human health or the environment. A current copy of the Plan will be maintained in the RFAAP facility operating record as well as in the Environmental Manager's files.

The overall objective of this Contingency Plan is to minimize hazards to human health or the environment from fires, explosions, or any unplanned sudden or non-sudden release of hazardous waste or hazardous waste constituents to air, soil, or surface water. This plan defines the actions to be taken in the event of an emergency within the permitted storage and treatment area.

II.E.1.b. Plan Contents

This Contingency Plan contains pertinent information to be used during an emergency situation and was developed in accordance with 40 CFR § 270.14(b)(7) and the sections referenced herein. The various sections and content of the plan are listed below along with the regulatory provision directing their inclusion.

- Section II.E.2 describes facility operations and the types of hazardous wastes managed at the Incinerator (40 CFR § 264.56);
- Section II.E.3 identifies the RFAAP Emergency Coordinator and alternates (40 CFR §§ 264.52 and 264.55);
- Section II.E.4 discusses Contingency Plan implementation (40 CFR §§ 264.52 and 264.56);
- Section II.E.5 presents a description of release prevention measures (40 CFR § 264.56);
- Section II.E.6 describes emergency response procedures (40 CFR § 264.56);
- Section II.E.7 describes coordination agreements between RFAAP and surrounding communities (40 CFR §§ 264.37 and 264.52);
- Section II.E.8 presents the permitted treatment and storage area evacuation plan (40 CFR § 264.52);
- Section II.E.9 outlines release-reporting requirements (40 CFR § 264.56); and
- Section II.E.10 includes requirements for Contingency Plan modifications (40 CFR § 264.53).

II.E.2. Facility Location, Operations, and Wastes Managed

This section provides background information that may be useful as part of an emergency situation. This information includes the location of the facility, operations performed at the facility, types of wastes managed, and potential emergency situations that could be encountered.

II.E.2.a. Facility Location

The RFAAP is located in southwest Virginia within Pulaski and Montgomery Counties as shown in Figure II.E-1. The RFAAP is located approximately 5 miles northeast of the City of Radford, 10 miles west of Blacksburg, and 47 miles southwest of Roanoke. The main entrance to the RFAAP is located on Virginia Route 114 between the Towns of Christiansburg and Radford. The RFAAP address is as follows:

Radford Army Ammunition Plant
4050 Peppers Ferry Road
Radford, Virginia 24141

The RFAAP encompasses approximately 4,104 acres. The New River separates Pulaski and Montgomery counties and also divides the RFAAP into two portions commonly known as the Horseshoe Area and the Main Manufacturing Area. These two areas and the approximate boundary of the RFAAP are shown on Figure II.E-1.

The Incinerator is located within the north central portion of the Horseshoe Area as shown in Figure II.E-1 and is used for the incineration of energetic wastes. Figure II.E-2 shows the Incinerator boundary and the locations of the actual structures. Figure II.E-3 is a schematic diagram that shows how the energetic wastes are processed as part of the treatment process.

II.E.2.b. Facility Operations

General operations performed at the RFAAP in the less than 90-day accumulation areas and the permitted treatment and storage area are described in the following sections.

i. RFAAP Operations

RFAAP is a government-owned, contractor-operated (GOCO) industrial installation operated by BAE Systems, Ordnance Systems Inc. (BAE) and responsible to the U.S. Army. The RFAAP's mission is to manufacture propellants, explosives, and chemical materials as assigned. As a GOCO operation, RFAAP has both Government and Contractor organizations. For the purpose of this permit application, the facility consists of all contiguous portions of the RFAAP. The facility specifically includes both the Horseshoe Area and the Main Manufacturing area. Wastes from onsite activities (including those of both the operating contractor and tenants) are temporarily stored in the less than 90-day accumulation areas and treated in the permitted storage and treatment area.

The facility was first constructed in 1940 and began operations producing smokeless powder (single base, double base, and triple base propellants) in 1941. Since that time various processes/products have been added to the facility including production of cast propellants, trinitrotoluene (TNT), commercial propellants, and load, assemble and pack facilities. Specific operations vary based upon contracted capacity and products from the Department of Defense and U.S. allies.

ii. Incinerator Operations

Operations included in the permitted storage and treatment area include grinding, tank storage, and incineration equipment. The primary structures included in the permitted storage and treatment area are as follows:

- The Grinder Building (identified as Building/Account No. 442), where wastes are ground into small pieces prior to being mixed into the slurry and incinerated. The Grinder Building houses the two permitted hazardous waste storage tanks.

- Incinerators 440 and 441 (identified as Accounts 440 and 441), where the slurried wastes are treated in accordance with this Permit and the Hazardous Waste Combustor National Emission Standards for Hazardous Air Pollutants.

The following areas are specifically excluded from the “permitted storage and treatment area” (refer to Figure II.E-2 for structure designations) as these are included in the RCRA Corrective Action Permit issued by the DEQ or were closed under previous closure plans administered by the DEQ:

- Settling Ponds #1 and #2 (identified as Accounts 445 and 446), which were designated as Solid Waste Management Unit (SWMU) No. 39 and were previously clean-closed under the USEPA RCRA Corrective Action Permit;

- Incinerator Fuel Oil Storage Units, including Structures 432 and 443, which were underground storage tanks used for fuel oil storage and were previously closed under a plan administered by the DEQ;

- Spray Pond (identified as Account 444), which was identified as Hazardous Waste Management Unit (HWMU) No. 39 and was previously closed under a plan administered by the DEQ; and

- Ancillary Building A-444, which served as the pumphouse for the spray pond and was previously closed under a plan administered by the DEQ.

In addition to these areas, there are several other structures in the general vicinity of the incinerators that are not included in the permitted storage and treatment area because they are not used to accumulate waste for periods greater than 90 days. These buildings and structures include:

- The incinerator control room and adjacent supply area (identified as Buildings 431 and 447);

- Temporary waste accumulation area (identified as Building 430), which is used to accumulate wastes for < 90 periods prior to treatment in the incinerator; and

- Ancillary buildings in the incinerator complex that store supplies and/or instrument equipment and calibration gases (identified as Accounts A-440, B-440, and A-441).

In addition to the buildings referenced above, numerous less than 90 day accumulation areas have been established in buildings throughout the RFAAP. Although these accumulation areas are not included in this Permit, the wastes stored within them and the procedures to be used in responding to emergencies at them are consistent with the wastes and procedures herein. Therefore, this Contingency Plan is intended to cover both the permitted storage area and the less than 90 day accumulation areas. A comprehensive listing of all the less than 90-day accumulation areas will be maintained in the facility's operating record.

While the site specific hazards, e.g., releases of hazardous waste, worker exposures, fire and explosion hazards may vary for each area, spill response and removal actions are generally the same for each area. For liquid spills response actions include containing the spill with cloth wipes, Pigs®, or sawdust and contacting supervision for further instructions. For most solid spills operations will be stopped and supervision will be contacted for further instructions. (Please note that a list of the specific buildings used for less than 90 day accumulation areas and the specific type of wastes contained in those areas (e.g., propellants, ignitable and reactive liquids, etc.) is required to be maintained on-site per Condition II.I.2.d.x and be made available for inspection):

Specific operations that are performed at the Incinerator are described below. Figure II.E-3 is a schematic diagram that shows how the wastes are processed as part of the treatment process.

1. Waste materials are transported from production areas in up to 20 gallon containers to a < 90-day accumulation area at Building 430 or Building 4601-7. (Note: the wastes are accumulated for less than 90 days and therefore these buildings are not permitted container storage facilities).

2. At the Grind House (Building 442), waste tubs are loaded onto a trolley, the energetic wastes in the tubs are then dumped into a hopper, and the waste is fed onto a conveyor. The waste is sprayed with water to minimize the chance of a waste explosion. Oversized and metallic materials are removed from the waste on the conveyor, and the screened waste is dropped into the grinder feed hopper. Again the waste is sprayed with water to minimize the potential for an explosion. The waste is then ground

and added to one of two slurry tanks. In the slurry tanks the waste is mixed with water to form waste slurry for incineration. These slurry tanks are not completely emptied every 90 days; therefore, these tanks have been permitted as greater than 90 day hazardous waste storage tanks.

3. The waste slurry is continuously circulated through a piping system between the incinerators' feed pump house and the slurry tank to prevent settling and buildup of solids in the lines. Waste slurry is pumped off the loop through the pump house and injected into the incinerators for treatment.

4. Residue from the incineration system is collected in ash buggies and drums and is temporarily stored in a <90-day accumulation area located in the area of the incinerators. The ash is staged on-site pending sample analysis and is then disposed in a properly permitted disposal facility.

II.E.2.c. Wastes Managed

The wastes that are stored and treated in accordance with this Permit are hazardous due to their ignitability (D001), reactivity (D003), and/or toxicity for certain metals and organics. Only those hazardous wastes that are within the specifications of the facility's RCRA Permit and the Waste Analysis Plan will be stored and treated in the permitted storage and treatment area. Neither radioactive wastes, nor mixed radioactive and hazardous wastes, nor wastes that are listed pursuant in 9 VAC 20-60-261, incorporating 40 CFR 261.31, 32, and 33 by reference, will be stored or treated at the permitted treatment and storage areas.

In general, the wastes that are stored and treated at the incinerator area include wastes that exhibit the following hazardous characteristic(s):

i. Reactivity (hazardous waste number D003) as specified in 9 VAC 20-60-261, incorporating 40 CFR 261.23 by reference;

ii. Toxicity, as specified in 9 VAC 20-60-261, incorporating 40 CFR 261.24 by reference, for one or more of the following contaminants:

a. Arsenic (hazardous waste number D004);

b. Barium (hazardous waste number D005);

c. Cadmium (hazardous waste number D006);

d. Chromium (hazardous waste number D007);

e. Lead (hazardous waste number D008);

f. Mercury (hazardous waste number D009);

g. Selenium (hazardous waste number D010);

h. Silver (hazardous waste number D011); and

i. 2,4-Dinitrotoluene (hazardous waste number D030).

iii. Ignitability (hazardous waste number D001) as specified in 9 VAC 20-60-261, incorporating 40 CFR 261.21 by reference.

A specific list of those wastes permitted for storage and treatment at the incinerator area is provided in Table II.E-1. As shown in the table, the wastes are classified into one of 19 different waste groups that are described in detail in the Waste Analysis Plan in Attachment II.B. These group numbers were assigned as the information on the waste groups was collected. There is no significance to the order of the group numbers in Table II.E-1.

i. Composition of Waste

The composition of the wastes fed to the Incinerator varies over time due to changes in the production schedule at the RFAAP. However, all of the wastes can be categorized into one of the 19 waste groups identified in Table II.E-1. This table identifies each waste group number and specifies the RCRA hazardous waste codes that may be applicable to that group. Information on the 40 CFR Part 261 Appendix VIII constituents that may be present in each group is provided in Table II of Appendix II.B-1.

If the Permittee wishes to store or treat waste whose formulation is not consistent with one of the groups identified in Table II.E-1 in the permitted storage and treatment area, the Permittee shall submit a request for permit modification.

ii. Identification and Quantity of Waste

The specific identification of wastes to be stored and treated at the permitted storage and treatment area(s) is recorded on an internal tracking record that accompanies the waste from the generation area. This permits easy identification of any material that is released. In the event of a release, the information provided on this internal tracking form and corresponding waste tag will be the primary means for identifying the material that has been spilled or otherwise released. These internal tracking forms and tags accompany each container of waste that is generated and transferred within the RFAAP. Should material from a slurry tank, the slurry loop, or the incinerator be released, information from the grind makeup sheet will be used to identify the materials that were present in the tank or piping at the time of release.

The quantity and location of hazardous wastes that are maintained on-site at the Incinerator are listed below:

- 3,800 gallons of waste slurry in two 1,900-gallon hazardous waste storage tanks;

- Accumulated waste awaiting processing in the grinder building (quantity varies based on production schedule); and

- Potentially hazardous waste ash collected in the incineration system (quantity varies depending on wastes treated).

II.E.2.d. Potential Emergency Situations

There are several situations that could lead to the release of hazardous waste at the Incinerator area that would require implementation of the Contingency Plan. The most common scenarios that could lead to such a release of hazardous waste are listed below:

1. Release of waste slurry due to slow leak or failure of slurry tanks, slurry piping, and/or slurry pump failure.

2. Release of liquid hazardous wastes during transfer to slurry or makeup water tanks.

3. Release of solid hazardous waste during transfer or processing in the Grinder Building, such as that resulting from a waste conveyor system failure.

4. Release as the result of a fire or an explosion of reactive wastes during processing or handling, such as that which could result from metal entering the grinder due to a metal detector failure.

The most serious situation at the Incinerator would be an explosion, as such an incident would pose an immediate danger to facility personnel and could allow for the release of a significant quantity of material. A non-explosive release of waste at the Incinerator presents less of an immediate danger to personnel, but response measures are still important as a safety issue for facility personnel and as a long-term issue for protection of human health and the environment.

II.E.3. Emergency Coordinators

The primary Emergency Coordinator (EC) for all environmental emergencies is the on-call representative from the Environmental Department. Additionally, the facility Incident Site Commander (ISC) will provide coordination of emergency response such as fire protection, medical attention, *etc*. The EC has the authority to determine and implement this Contingency Plan and commit the necessary resources to do so. The EC will receive assistance in these duties from the ISC where appropriate.

The facility has an on-site Fire Department. Environmental emergencies are primarily communicated to and handled by the Environmental Manager and the Environmental Staff in accordance with applicable regulations. The Environmental Manager coordinates all pollution control and remediation activities including monitoring, containment, control, countermeasures, clean-up, and disposal activities.

Other facility employees are designated as alternate EC and are qualified to act as EC in event the primary EC is unavailable. A (primary or alternate) EC will be available or on call at all times. The facility personnel who are designated as ECs are listed in Table II.E-2 (the Notification Action Summary sheet). The alternate ECs are called on to act as the EC in the event of an emergency in the order listed in the table.

All of the persons identified as ECs (primary or alternative) are qualified by experience and training to act as the EC. All of these persons hold management positions at the facility, have been trained to respond to emergencies dealing with hazardous waste management, and have extensive experience in the propellant manufacturing environment.

In order to enhance the protection of defense services and defense articles and protect the unauthorized export of defense information under the International Traffic in Arms Regulations (ITAR), promulgated in Title 22 Code of Federal Regulations (CFR) Parts 120 through 130, the actual names and contact information of individual persons designated as an EC (primary or alternate) have been withheld from this Permit. This information is readily available for review and inspection at the facility upon request. The relevant data is also readily available to plant security and supervision to respond to an emergency.

II.E.4. Implementation

The Contingency Plan will be implemented whenever there is a fire, explosion, or release of hazardous waste or hazardous waste constituents that could threaten human health or the environment. The EC will be responsible for evaluation of any situation to determine if the Contingency Plan will be implemented. Situations that could require implementation of the Contingency Plan include:

1. Fire and/or Explosion - The primary hazards that accompany explosions and deflagrations are blast overpressure, fragmentation (primary and secondary), and thermal effects. Such instances would require implementation of the Contingency Plan if:

a. A fire causes the release of toxic fumes.

b. The fire spreads and could possibly ignite materials at other locations onsite or could cause heat-induced explosions.

c. The fire could possibly spread to off-site areas.

d. Use of water and/or chemical fire suppressant could result in contaminated run-off.

e. An imminent danger exists that an explosion could ignite other hazardous waste because of flying fragments or shock waves.

f. An imminent danger exists that an explosion could ignite other hazardous waste at the facility.

g. An imminent danger exists that an explosion could result in release of toxic material.

h. An explosion has occurred that has released toxic material.

2. Spills or Natural Release

a. The spill could result in release of flammable liquids or vapors, thus causing a fire or gas explosion hazard.

b. The spill could cause the release of toxic liquids or fumes.

c. The spill can be contained onsite, but the potential exists for contamination of the soil or groundwater.

d. The spill cannot be contained onsite, resulting in offsite soil contamination and/or ground or surface water contamination.

It shall be the duty of all facility personnel to follow the direction of the EC when the decision has been made to implement the Contingency Plan.

The person observing an emergency situation at the Incinerator will most likely be someone other than the EC. That person is to take the following actions to involve the EC as soon as possible:

1. Ensure his/her personal safety.

2. Activate the emergency warning alarm system if the incident occurs at the Grinder Building (Bldg. 442) or immediately notify the EC if it is at a location other than Building 442.

3. Telephone, radio, or otherwise notify the control room of any observed releases (*e.g.*, spills, fires, or explosions) and report: his/her name, location, and nature and extent of the release. The control room personnel will immediately notify the Security Dispatcher and the Foreman. The Security Dispatcher will immediately notify the EC via the Environmental on-call phone.

4. Remain available to assist the EC with information about initial observations of the incident.

II.E.5. Release Prevention measures and control procedures

RFAAP has general facility-wide control procedures to minimize the potential for fires, explosions, and chemical releases as part of overall facility operations. Additional measures have been implemented at the Incinerator to prevent and/or control the propagation of such incidents.

II.E.5.a. RFAAP Control Procedures

The RFAAP is designed so that process, raw material storage and product storage facilities present a minimal threat of fire, explosion or material release. These process and storage operations are not subject to RCRA regulation. However, in the course of normal operation and maintenance, hazardous wastes are generated. Because safeguards exist for the non-RCRA regulated processing operations, this also protects against hazards once the waste is generated in the plant.

In the event of a fire, explosion or spill involving hazardous waste, the EC will notify the area foreman to direct personnel to contain, absorb, package, or redirect spilled materials as deemed necessary to protect human health or the environment. For this purpose, the plant maintains an adequate supply of hand and motorized tools and clean, empty containers for recovering spilled hazardous wastes.

The EC has the authority to direct trained fire crews to contain and control fires and cool affected areas to prevent further spread of hazard. This direction shall be coordinated through the onsite plant fire chief.

II.E.5.b. Incinerator Operating Procedures

Standard operating procedures for the operation of the Incinerator include provisions for monitoring and shutdown of the treatment and processing equipment. Process operations are monitored remotely from the control room and include safety features to ensure safe operation of the unit. Should an emergency situation occur at the incinerator, the system will be shutdown to prevent danger to human health or the environment.

II.E.5.c. Prevention of Recurrence or Spread of Fires, Explosions or Releases

Numerous precautions are taken in the <90-day accumulation areas and at the permitted storage and treatment area to reduce the likelihood that fires, explosions, or other unsafe conditions occur. These precautions take the form of engineering controls and procedural methods to either help prevent a fire or reduce the spread or damage caused by it. A summary of these procedures is provided in the section that follows.

Sprinklers, when activated, automatically provide notification to the RFAAP Fire Department. These sprinklers are activated automatically if a fire is sensed and may also be manually activated by the operators if necessary. In addition, fire extinguishers are on hand for immediate use (refer to Section II.E.6c of this Plan for a complete list and location of available emergency equipment).

Barricades at the grinder and incinerator buildings have been designed in accordance with DOD standards to help prevent the propagation of explosions due to flying fragments impacting nearby operations at the facility. In addition, a number of measures have been implemented to prevent and/or control the spread of fires, explosions, or other releases as noted below:

1. The waste slurry stored in the tanks and pipes is an aqueous mixture of energetic wastes. The grinding of the waste energetic to form an aqueous slurry helps prevent the occurrence of fires and explosions. This also allows for a closed loop feed system to the incinerators and minimizes the operator handling of the waste materials.

2. Operating procedures for shutting down the grinder are part of the facility's plant emergency procedures. These procedures are designed to help prevent the release of hazardous wastes should a system upset or malfunction occur.

3. Secondary containment systems for the two hazardous waste slurry tanks (described in Section II.E.6e) help prevent any released material from entering the environment.

4. Process equipment in the Grinder Building includes a grinder fail-safe system, which flushes the slurry lines with water in order to clear the lines of residual slurry. The fail-safe system is activated in the event of either a process air system or electrical shutdown. (Compressed air is used to operate several pneumatically actuated valves within the Building.) Thus, if the facility operations are stopped, the lines will be cleared of waste slurry and slurry from the tanks will be collected in the containment system. After the slurry lines flush, the operators turn off the fail-safe system, evacuate to the control room, and monitor the fail-safe system and incinerator controls during an emergency response.

The incinerators have built-in safeguards against equipment failure during emergency conditions. These safeguards help prevent fires, explosions, and the release of waste slurry. The following conditions will trigger an emergency shutdown of the incinerator:

- The control system fails;
- An electrical power failure occurs;
- The induced draft fan fails;
- The kiln stops rotating;
- The cooling and recirculating pump fail-safe systems activate;
- The air compressor fail-safe system is activated; or
- A high temperature (safety) limit is reached in the kiln, afterburner, or evaporative cooler.

Should there be a fire, explosion, or release of hazardous materials at the Incinerator, the EC and other environmental and operational personnel will review the incident after response and clean-up activities are completed. Based on this review, the cause will be determined, if possible, facility operating procedures or design will be revised as necessary, and other corrective actions will be taken in order to help prevent a reoccurrence. The Contingency Plan will also be revised as necessary to improve facility response to future incidents.

II.E.6. Emergency Response Procedures

This section outlines procedures to be followed during an emergency. Information on the EC responsibilities, the required notifications, control, cleanup, and mitigation procedures is presented. Specific emergency response procedures for each hazardous waste management area are provided in Appendix II.E-2.

II.E.6.a. Emergency Coordinator's Responsibilities

When the decision has been made to implement the Contingency Plan, the EC’s responsibilities will include, but will not be limited to, the following:

1. Identifying hazardous materials and assessing hazards;
2. Accounting for facility personnel;
3. Implementing internal notifications;

4. Coordinating first-aid activities;

5. Controlling and monitoring site conditions;

6. Activating the Evacuation Plan, if required;

7. Notifying appropriate State and local authorities (coordinated with the Environmental Department);

8. Coordinating the storage, treatment, and disposal of released material; and

9. Providing post-emergency management.

II.E.6.b. Notifications

Procedures for the notification of RFAAP personnel and appropriate federal, state and local agencies are included in this section. The Notification Action Summary is provided in Table II.E-2 of this Contingency Plan. Should the EC be offsite at the time of the emergency, these notifications shall be made by the designated alternate EC or another onsite designee.

i Internal RFAAP Notifications

Internal communication systems (telephone or two-way radios) will be used to notify RFAAP personnel. The appropriate alarms will be activated and the EC will be notified in an effort to implement the Contingency Plan as outlined in Section II.E-4.

ii Notification of Federal, State, and Local Agencies

The Environmental Manager (or a designated alternate) will notify appropriate state and local agencies as outlined in this plan and as listed below.

In the event that a release occurs that could threaten human health or the environment outside the facility, the EC shall report his/her findings as follows pursuant to 40 CFR 264.56(d). Accordingly, the EC shall notify:

- The National Response Center at (800) 424-8802;

- The Virginia Department of Environmental Quality, Blue Ridge Regional Office, at (540) 562-6814 or (540) 562-6700;

- The Virginia Department of Emergency Management at (800) 468-8892; and

- The local emergency planning committee offices as follows:

  - The Montgomery County Local Emergency Planning Committee at (540) 382-2951 if the emergency is within Montgomery County; or

  - The Pulaski County Emergency Management Coordinator at (540) 980-7705 if the emergency is within Pulaski County.

Additionally, if the EC determines that an evacuation of local areas may be advisable, he/she shall immediately notify appropriate local authorities. The EC shall be available to help appropriate officials decide whether local areas should be evacuated.

In the event that an emergency situation occurs that requires notification of outside agencies, the following information shall be reported:

1. Name and telephone number of the notifier;

2. Name and address of facility;

3. Date, time, and type of incident;

4. Name and quantity of material(s) involved to the extent known;

5. The extent of injuries, if any; and

6. The possible hazards to human health or the environment outside the facility.

II.E.6.c. Emergency Equipment Available

The emergency equipment available and "on-call" for use at the unit is summarized in Table II.E-3 and Figure II.E-4. The table also provides required specifications on referenced equipment (*e.g.,* fire extinguisher type and volume) when it is defined by the RFAAP safety and/or fire protocols. The numbers (1-12) in Table II.E-3 indicate the different physical locations and Figure II.E-4 shows these locations within the facility.

In addition to the equipment listed in Table II.E-3, other fire, personnel protection and cleaning equipment is available as follows. Fire protection equipment includes sprinkler systems (Building 442), portable fire extinguishers, a mobile carbon dioxide extinguishing system, and fire hydrants near the hazardous waste facilities and at various locations within the plant. Cleaning equipment such as brooms, dustpans, and sawdust is found in the Grinder Building (Building 442). Additional spill cleanup equipment is located in the Roads and Grounds Building (Building 7217).

II.E.6.d. Containment, Countermeasures, Clean-Up and Disposal

General response measures that will be implemented during an emergency situation at the Incinerator are presented below.

1. *Ensure Personal Safety, Sound Alarm and Notify Emergency Coordinator*: Upon identification of a fire, explosion, or other release personnel shall ensure their personal safety and then activate the alarm system and notify the EC. The alarm system consists of radio and telephone. Both forms of alarm are accessible at the Incinerator. The alarms will be used to contact the Security Dispatcher, which is staffed 24 hours a day, 7 days a week.

2. *Evacuation*: Personnel will evacuate the area as outlined in the Evacuation Plan in Section II.E-8 and as directed by the EC.

3. *System Shutdown*: In the event of a fire, explosion, material release or other system emergency, the incinerator operations will be shut down so that personnel can enter the area to respond.

4. *Identify the Material(s) Involved*: The specific identification of wastes will be determined from the internal manifest forms, which identify the materials that are sent to the Incinerator. Copies of the manifests are carried in the transport vehicles carrying the waste. Upon delivery to the treatment facility, the manifests are transferred from the transport vehicles and are kept at the Incinerator Control Room.

5. *Assessment*: Upon arrival at the scene, the EC (or the designated alternate) will take control of the affected area including all resources necessary to deal with the emergency. The EC will maintain this authority and control until the emergency has been eliminated and cleanup is complete.

   After taking control of the affected area, the EC will determine the source, extent, and nature of the involved hazardous waste and assess any primary and secondary hazards. Waste generation, source and analytical data are to be used to make this determination. These records shall be kept on-site. The evaluation criteria used by the EC to determine if the Contingency Plan is to be implemented are presented in Table II.E-34. A logic diagram representing the evaluation process is shown as Figure II.E-5.

6. *Alert Local Authorities for Assistance*: Should the situation require resources beyond those available at the RFAAP, local fire, police, and/or medical support will be requested as described in Section II.E-7.

7. *Implement Spill Response Measures*: Spill response measures will be implemented as outlined in Table II.E-5 using spill response equipment

available at the facility as listed in Table II.E-3 and materials provided by supporting communities as needed. Response measures include evaluation of safety issues, containment of the release, regulatory notifications, waste treatment, and monitoring. Response measures will be performed by the RFAAP Fire Department and Emergency Response Team under the direction of the EC with assistance from other local agencies as needed.

8. *Accumulation and Treatment of Released Material*: If a spill or leak occurs in the Grinder Building, the released material will be contained in the secondary containment system. The slurry will drain to a sump that can be pumped to the catch tank. If hazardous waste is released to the ground such as may occur due to a failure in the slurry feed line, applicable spill response measures outlined in Table II.E-5 will be followed. Recovered energetic waste will be treated at the open burning ground, if appropriate.

   Ash from fires will be treated similar to incinerator ash. The ash will be analyzed for reactivity, TCLP toxicity, and other constituents as specified in the Waste Analysis Plan in Attachment II.B of this Permit. If the ash fails for either or both characteristics or is a listed hazardous waste, it will be taken to a RCRA permitted facility. If it is not determined to be a hazardous waste, it will be disposed in an appropriately permitted solid waste landfill.

9. *Incompatible Wastes*: There are no wastes stored or treated in the permitted storage and treatment area that are incompatible with one another. Therefore, the danger of the mixing of incompatible wastes during cleanup procedures is very unlikely. However, procedures are provided to each of the areas on how to prepare wastes for disposal. These procedures provide information on which wastes are acceptable at each of the two main treatment areas (incinerators and open burning ground) and directions on segregating those materials that cannot be processed through the incinerators' grinder. In addition, the procedures also provide instruction on how to properly tag and manifest the wastes to ensure they are properly identified and handled appropriately. These internal waste manifests and container tags serve to identify the wastes, their point of generation. Upon receiving the wastes, the incinerator operators inspect the waste containers to confirm that they are properly labeled and manifested. They are also visually inspected to confirm that prohibited materials are not provided in the container.

II.E.6.e. Incinerator-Specific Response Measures

Specific measures for the slurry tanks and for the incinerators are included in the following sections.

i Container Spills and Leakage

There are no permitted container storage areas within the RFAAP incinerator complex. However, both the Grinder Building and Building 430 may contain hazardous waste containers that are stored on a temporary basis. In addition, any of the less than 90 day storage areas may hold containers of hazardous waste at any time. In the event that one of these containers should spill or develop a leak, the spill will be immediately contained using sawdust. Ample sawdust will be added to completely absorb all liquid in the spilled materials. After the spill has been adequately contained, the material will be swept up and placed into a new hazardous waste storage container. The container will be labeled to clarify the contents of the container and an internal waste manifest will be completed. The collected material will then either be treated onsite at either the incinerator complex or the burning ground or will be shipped offsite to a properly permitted disposal facility if it cannot be treated onsite. If the spill resulted from a leaking or otherwise defective container, the container will be removed from service and disposed in accordance with all applicable laws and regulations.

ii Tank Spills and Leakage

In the event of a spill or release from the hazardous waste tank system, the released material should be contained in the secondary containment system. Tank level indicators are monitored by operators in the control room. Should indication of a leak or spill be provided, a visual inspection of the area will be conducted immediately. Additionally, the secondary containment system is inspected every 24 hours to determine whether any leaks have occurred in accordance with 40 CFR 264.193(c)(3). The containment system in Building 442 consists of the makeup tank and a sump pump drainage system. Liquid or slurry that collects in the sump is pumped to the exterior catch tank. From there, the liquid can be pumped back into the makeup tank or the slurry tanks, or, can be pumped into a portable tanker truck for accumulation or transfer.

Upon detection and visual inspection of a leak or spill, RFAAP will comply with all applicable requirements of 9 VAC 20-60-264 and 40 CFR 264.196(a) through (f). Grinding operations feeding any leaking tank will immediately cease, and any leaking tank will be emptied. The spilled or residual waste from the sump, basement of the building, or catch tank will be placed into waste containers and removed. The collected wastes will either be sent to the open burning ground or placed in the other slurry tank and incinerated when operations are able to resume. Waste that has leaked from a tank or that remains in the leaking tank will be removed from the leaking tank, containment system, and/or floor sump within 24 hours. Any leaking tank will be inspected, the cause of the failure determined, and the defect repaired pursuant to the requirements of 9 VAC 20-60-264 and 40 CFR 264.196(e), and certified by an independent Virginia registered professional engineer pursuant to 40 CFR 264.196(f) prior to being returned to service. In the event that a repaired tank is returned to service, the Director of the Virginia

Department of Environmental Quality must be notified that the repaired tank has been returned to service within seven (7) days. If a leaking tank cannot be repaired, the tank system will be closed in accordance with 9 VAC 20-60-264 adopting 40 CFR 264.196(e) by reference unless any of the following conditions are satisfied:

- If the cause of the release was a spill that has not damaged the integrity of the system, then the owner/operator may return the system to service as soon as the released waste is removed and repairs, if necessary, are made.

- If the cause of the release was a leak from the primary tank system into the secondary containment system, the system must be repaired prior to returning the tank system to service.

- If the source of the release was a leak to the environment from a component of a tank system without secondary containment, the owner/operator must provide the component of the system from which the leak occurred with secondary containment that satisfies the requirements of §264.193 before it can be returned to service, unless the source of the leak is an aboveground portion of a tank system that can be inspected visually. If the source is an aboveground component that can be inspected visually, the component must be repaired and may be returned to service without secondary containment as long as the requirements of paragraph (f) of this section are satisfied. If a component is replaced to comply with the requirements of this subparagraph, that component must satisfy the requirements for new tank systems or components in §§264.192 and 264.193. Additionally, if a leak has occurred in any portion of a tank system component that is not readily accessible for visual inspection (e.g., the bottom of an inground or onground tank), the entire component must be provided with secondary containment in accordance with §264.193 prior to being returned to use.

In the event of a tank overfill/rupture or pipe rupture, standard procedures for handling a liquid spill containing energetic materials will be followed. Any contaminated equipment will be decontaminated and reused or decontaminated and disposed of as excess equipment or as hazardous waste, if appropriate. Spilled waste collected in containers will receive treatment as soon as one of the explosive waste incinerators is properly operating again. The waste will be kept at the facility's container management area in accordance with 9 VAC 20-60-262, 40 CFR 262.30 through 33, and 40 CFR 262.35 until the time that treatment begins.

iii Incinerator Spills and Leakage

A release of materials from the slurry loop line or in the area of the incinerator may occur due to failure of the slurry line either by rupture or gasket failure.

Spill response measures to such an incident are outlined in Table II.E-5. The EC will direct the spill response program. Procedures are provided in these tables and associated permit paragraphs concerning safety, containment, evaluation, notification, treatment, and monitoring as related to each spill incident.

The perimeter of the concrete slab on which the incinerators are located contains a grated gutter to capture washdown water. Any slurry that may leak onto the slab will be washed into the gutter and will be pumped into the same external catch tank that provides containment for the Grinder Building (Bldg. 442). Response procedures to leaks or spills outside of the incinerator slab are outlined in Table II.E-5. Decontamination and repair of the unit will be accomplished depending on the type of repair required. For example, if welding is required, the material must first be decontaminated with heat. If welding is not required, the material can be decontaminated with water.

II.E.6.f. Disposal of Miscellaneous Waste and Debris

Wastes generated as part of a response action will be collected and contained. Those materials that cannot be treated in the incinerator or the open burning area will be characterized and disposed of off-site in accordance with state and federal laws. Such wastes may include but are not limited to the following:

- Personal protective equipment;
- Plastic sheeting used for decontamination or containment;
- Absorbent materials; and
- Contaminated soil and/or water.

II.E.6.g. Post-Emergency Equipment Maintenance

Post-emergency provisions are designed to prevent recurrence, to clean up and dispose of residuals, to decontaminate equipment, and to provide for personnel debriefing.

The EC will take all necessary steps to ensure that a secondary release, fire or explosion does not occur after the initial incident. Procedures that will be carried out in the affected area include:

1. Inspection for any leaks or cracks in pipes, valves, tanks, and incinerators;
2. Inspection for excess heat generation at the incident area; and
3. Isolation of residual waste materials.

All waste energetics and other cleanup residues will be tested for RCRA characteristics and other parameters as necessary to meet waste profiling requirements. The material will then be transported to a RCRA permitted facility should it be determined to be a hazardous waste. If the residues are determined to be non-hazardous, they will be disposed in a permitted solid waste landfill.

All equipment used during the cleanup will be decontaminated on-site and readied for future use. Site personnel will remove and properly dispose of contaminated clothing as necessary. Fire extinguishers will be recharged, personnel protective equipment will be replaced, and tools will be restocked. Before operations are resumed, all safety equipment will be inspected to be sure that it is fit for its intended use.

II.E.7. Coordination Agreements

Mutual assistance agreements have been made with the communities identified in Table 1 of Appendix II.E-1. Copies of the Mutual Assistance Agreements and Supplemental Agreements are maintained onsite in the facility operating record. These mutual assistance agreements pertain to the local fire departments. Furthermore, there is close cooperation between local law enforcement officials and RFAAP Security personnel for traffic control in the plant area if a significant disaster should occur.

Facility staff will contact selected local and regional entities and authorities that may be involved in an emergency situation according to the anticipated needs at the plant. Personnel from these organizations may be asked to support RFAAP personnel in response to fires, explosions, or chemical releases if RFAAP personnel cannot adequately address the situation internally. Personnel from these agencies will act under the direction of the EC and will be directed and escorted by plant personnel.

Arrangements with local hospitals have also been made through agreements between RFAAP and surrounding medical facilities. Table 1 in Appendix II.E-1 identifies those agreements that are in place. Copies of these agreements are maintained onsite in the facility operating record. In addition, the RFAAP medical staff is familiar with the properties of the hazardous wastes handled at the facility and the types of injuries or illnesses that could result from fires, explosions or releases at the facility, and RFAAP firemen are state-certified emergency medical technicians.

Due to RFAAP's in-house fire department, medical staff, and security force, and the unique wastes to be dealt with, the facility EC will act as the primary authority during emergency situations. RFAAP security personnel are responsible for escorting local fire department and emergency response teams to any emergency site within the plant. Emergency units from offsite will not be allowed to respond inside RFAAP without an escort. For incidents in the horseshoe area, units may be asked to assemble at Gate 10 or the main gate on Route 114. For incidents in the Main Plant Area and larger incidents in the Horseshoe Area, units from may be asked to assemble at the Main Gate on Route 114. Entry to the manufacturing area will usually be through Gate 1.

II.E.8. Evacuation Plan

The Incinerator is located within the north central portion of the Horseshoe Area of the facility. This area is an isolated location as shown on Figure II.E-1. The New River acts as a protective barrier on the northern and southern exposures of this area. Thus, if an emergency situation should develop at this area, evacuation of the entire facility is not likely to be necessary. The Incinerator operating personnel should be the only persons immediately endangered during an emergency situation at the facility.

Evacuation procedures for the incinerator area direct personnel to assemble at Building 447 (Control Room) in the event of a fire, explosion, or other event in the area. Should evacuation of the area be deemed necessary, it will proceed as follows:

1 The grinder operation will be shut down and all personnel will gather in the control room.

2 Container accumulation area operations shall be stopped and secured. All personnel at the container accumulation area shall return to the control room.

3 Propellant feed into incinerators will be stopped. The incinerator slurry feed line will be flushed.

4 Slurry will continue to circulate through loop system if deemed safe.

5 Operations will be resumed when directed by supervisory personnel.

During process operations, the operators are either located in or near the control room or are within the permitted treatment and storage area. Personnel will move to and remain in the control room, an underground, blast-proof facility, during evacuation periods. Communication among the operators will be through existing two-way radio communication systems, telephones, or through the warning horn located on the Grinder Building and activated at the incinerator complex. The small number of people in the area, the accessible communication systems, and the close proximity of the evacuation area help ensure a safe evacuation plan at the permitted treatment and storage area.

In addition to the local communication system at the incinerator, the RFAAP also has a mass notification alarm system that is intended to identify persons within the facility of emergency situations as they occur. Systems are in place to warn facility personnel of the following situations:

- Active shooter situation
- Chemical release
- Fire or explosion
- Lightning warning
- Natural disaster alert

Each type of situation will be communicated through a unique alarm signal over the plant-wide "loud-voice" system. The initial alarm is then followed by a verbal warning message that is broadcast through 12-different speaker stations located throughout the plant. Upon conclusion of any of these emergency scenarios, an all-clear alarm (Westminster chimes) and verbal message will be provided via the same loud voice system.

The primary evacuation route for persons within the permitted treatment and storage area is shown in Figure II.E-6. While the primary route for evacuation to the control room is via a direct paved path, the area surrounding the facilities is unoccupied, so alternate evacuation routes from the hazardous waste facilities to the control house may take any number of paths through the grass turf.

II.E.9. Required Reports

Pursuant to 9 VAC 20-60-264; 40 CFR 264.56(i), the time, date, and details of any incident that requires implementation of the Contingency Plan will be noted in the facility operating record. In addition, within 15 days after the incident, a written report will be submitted to the Director of the Virginia Department of Environmental Quality. The report will include:

1. Name, address and telephone number of the owner or operator;
2. Name, address and telephone number of the facility;
3. Date, time, and type of incident;
4. Name and quantity of material(s) involved;
5. The extent of injuries, if any;
6. An assessment of actual or potential hazards to human health or the environment, where this is applicable;

7. Estimated quantity and disposition of recovered material that resulted from the incident; and

8. Such other information specifically requested by the Director that is reasonably necessary and relevant to the purpose of an operating record.

Pursuant to 9 VAC 20-60-264; 40 CFR 264.196(d), for any tank system or secondary containment, any release to the environment, except as provided in item 1 below, will be reported to the Department within 24 hours of its detection. However, if the release has been reported pursuant to 40 CFR Part 302, that report will satisfy this requirement.

1. A leak or spill of hazardous waste is exempted from the reporting requirements of Section II.E-9 of this Contingency Plan, if it is:

   a. Less than or equal to a quantity of one pound, and

   b. Immediately contained and cleaned-up.

II.E.10. Modification of Plan

Pursuant to 9 VAC 20-60-264; 40 CFR 264.54, this Contingency Plan is subject to review and amendment, if:

a. The plan fails in an emergency;

c. The facility permit is revised;

d. The facility changes in design, construction, operation, maintenance, or other circumstances; in a way that materially increases the potential for fires, explosions, or releases of hazardous waste constituents; or changes the response necessary in any emergency;

e. The list of emergency coordinators changes; or

f. The list of emergency equipment changes.

When the contingency plan is amended for any reason the Permittee will request a permit modification pursuant to 40 CFR 270.42.

Figure II.E-1 – Location of the RFAAP

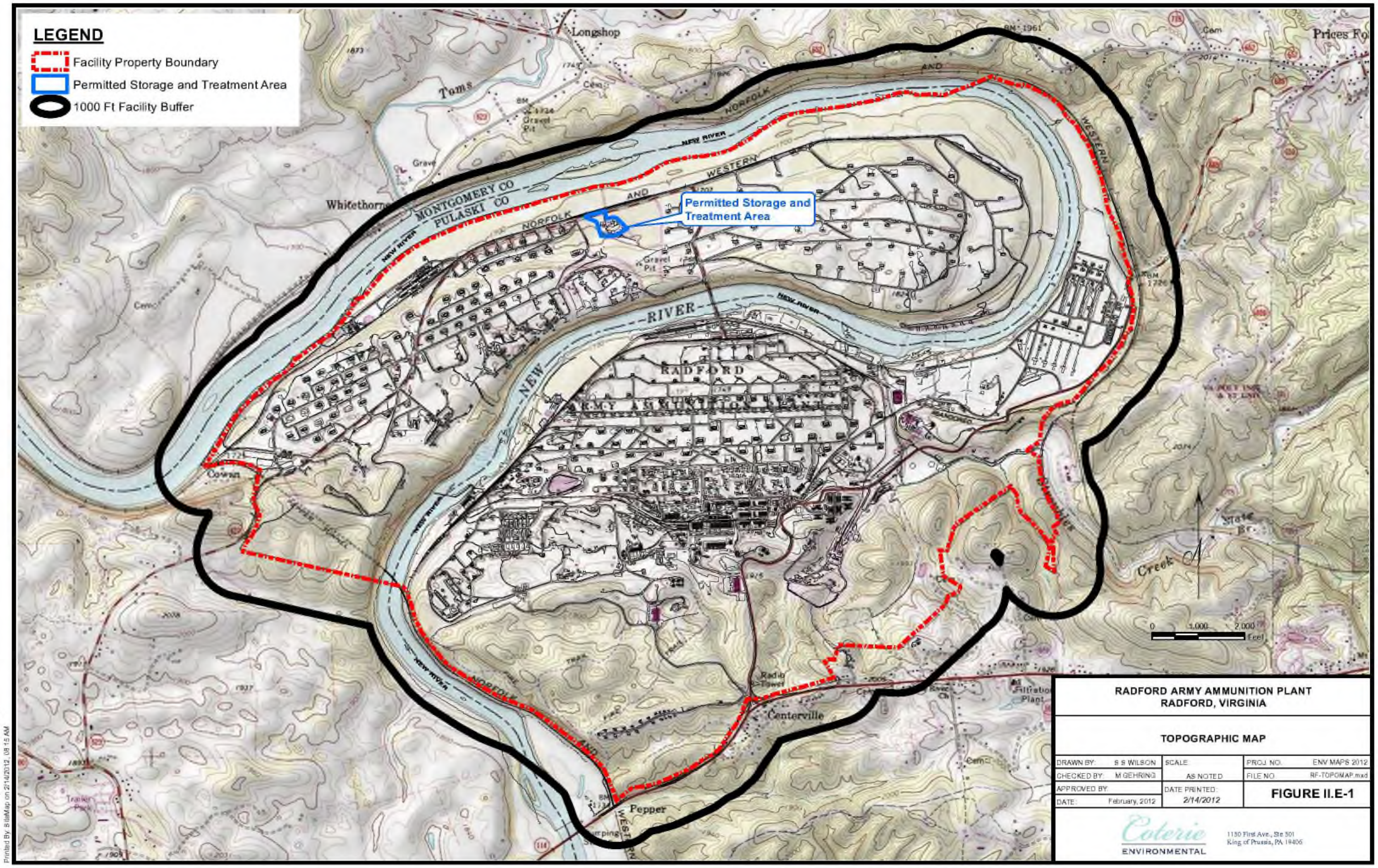


Figure II.E-2 – Area Map

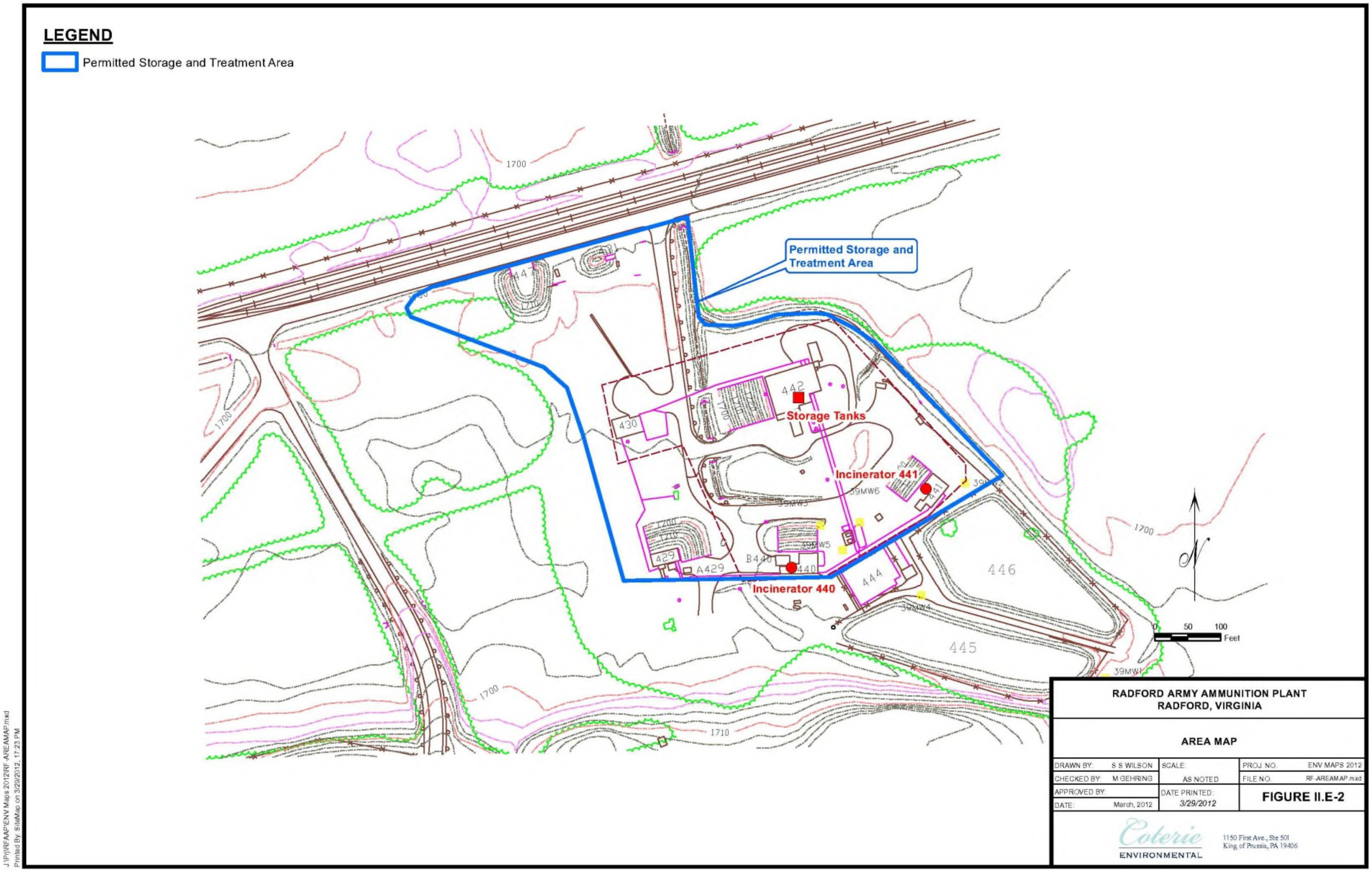


Figure II.E-3: Incinerator Process Schematic

FIGURE II.E-3
INCINERATOR PROCESS SCHEMATIC

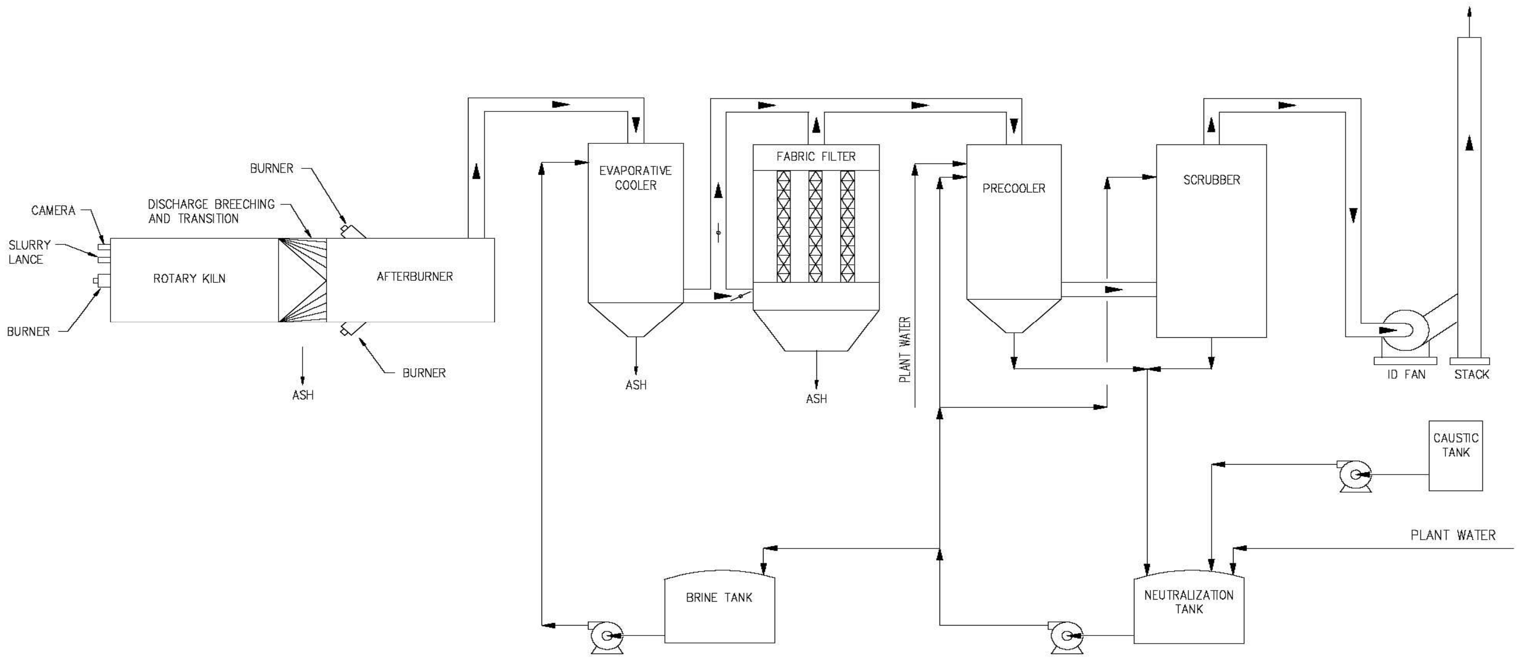


Figure II.E-4: Emergency Equipment Locations

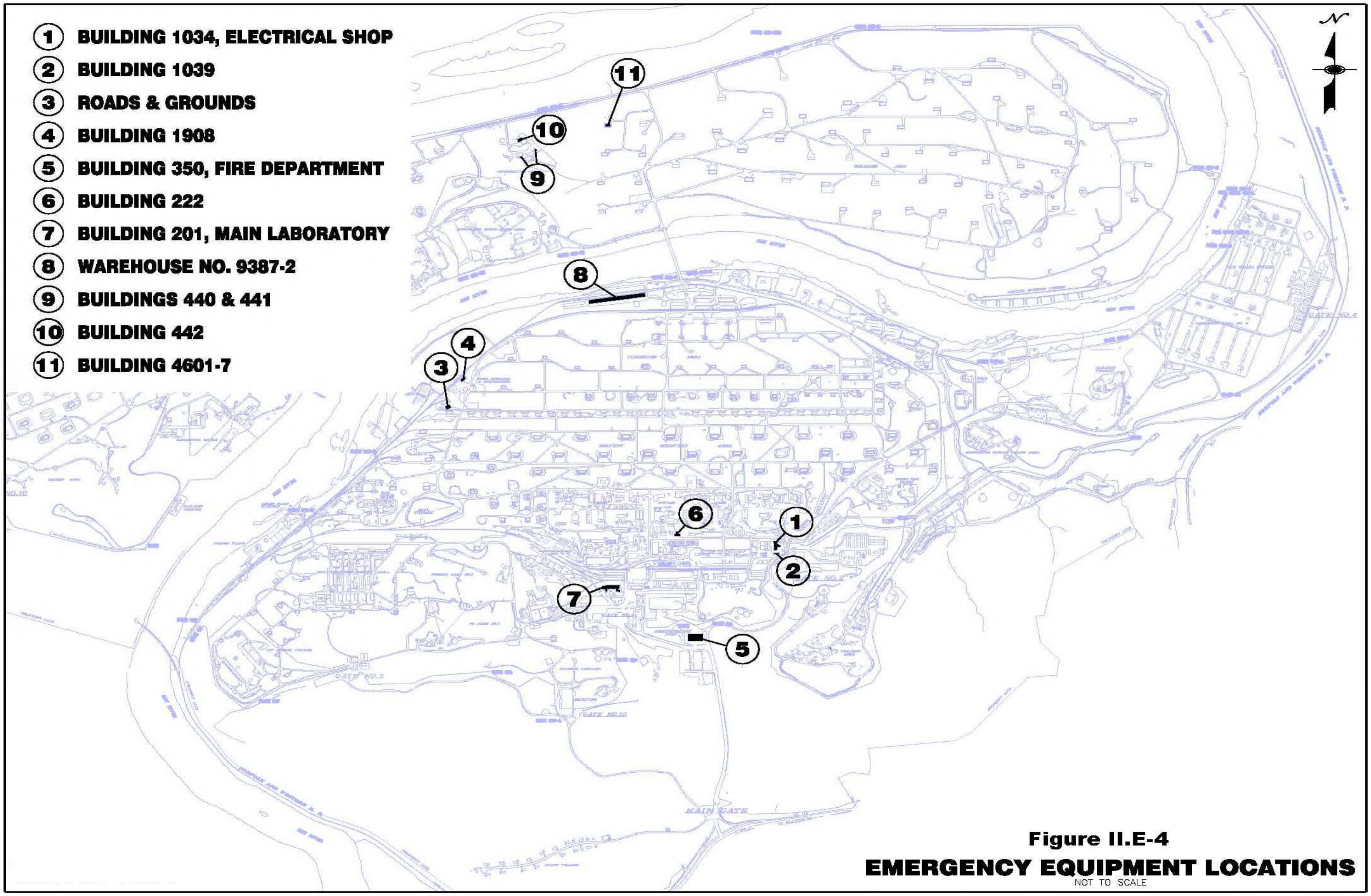


Figure II.E-5: Contingency Plan Implementation Logic Diagram

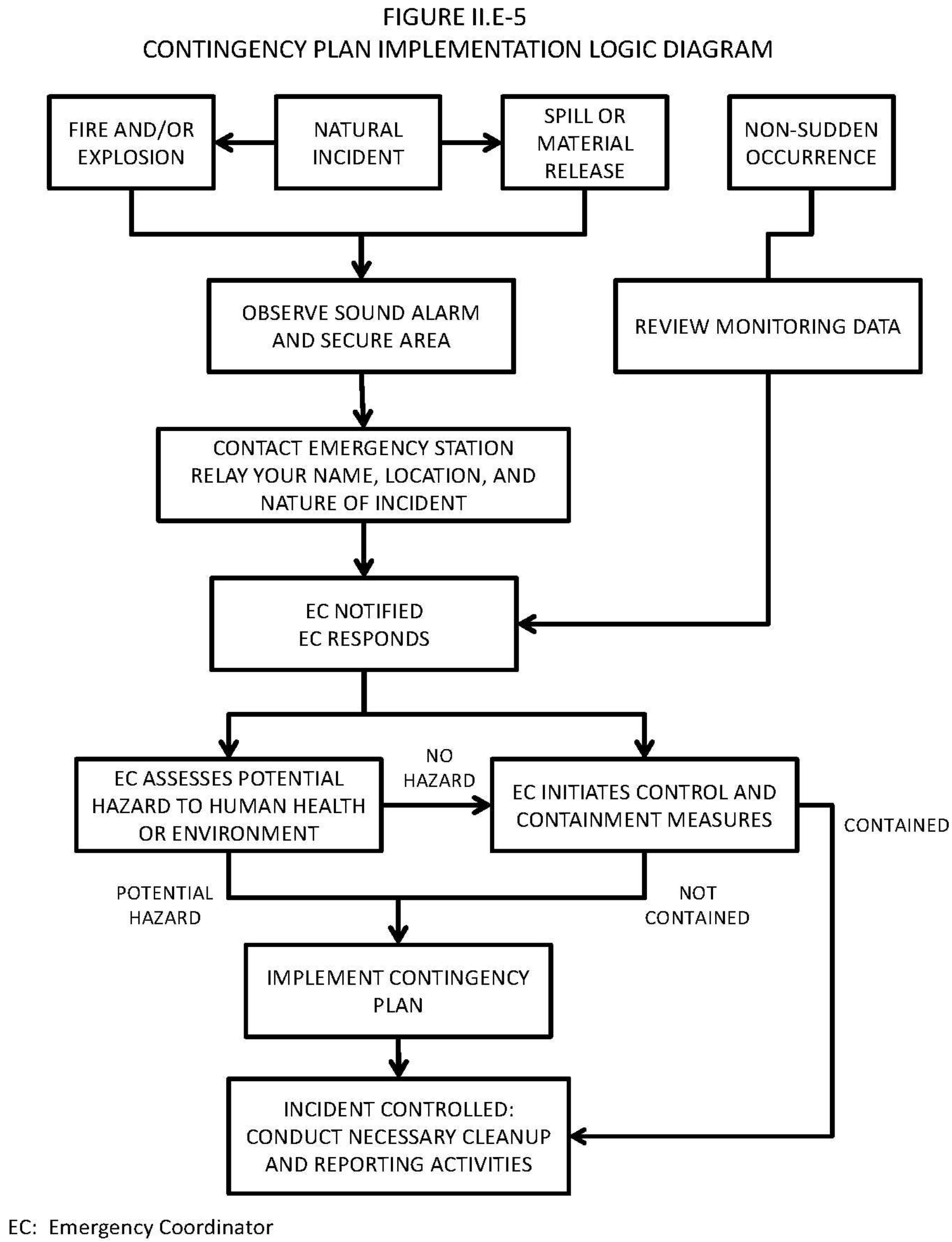


Figure II.E-6 – Area Evacuation Routes

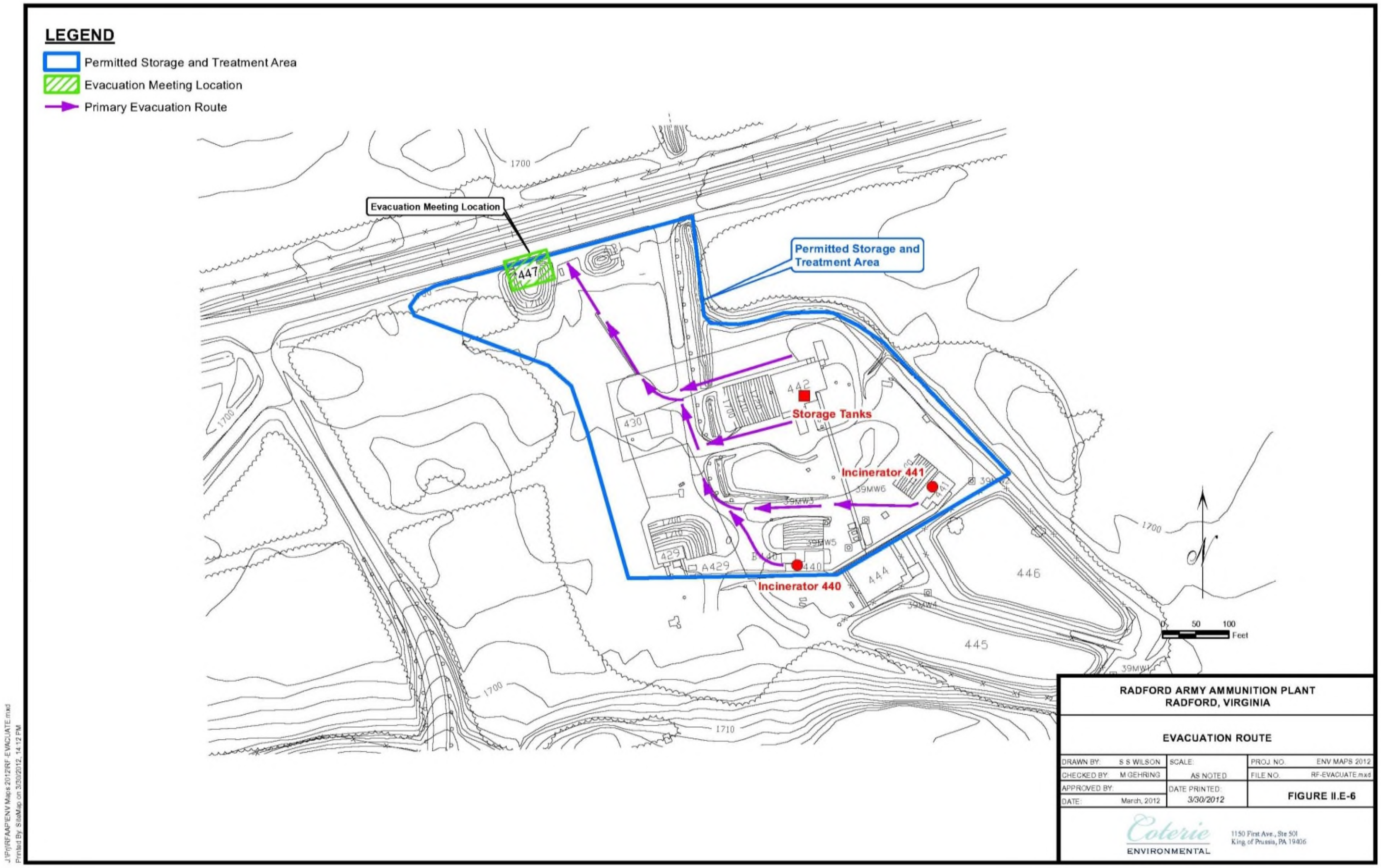


TABLE II.E-1 - WASTE GROUPS BURNED AT THE INCINERATORS RADFORD ARMY AMMUNITION PLANT

Group No.	Description	Defining Characteristics
1	Miscellaneous Waste	Ignitable and reactive Liquids in Sawdust D001, D003
2	Miscellaneous Waste	Propellant Laboratory Waste D003, D008, D030, D004
3	Miscellaneous Waste	Pit Cotton (Waste Nitocellulose) Solid Waste
4	Miscellaneous Waste	Dinitrotoluene and Trinitrotoluene Wastes from manufacturing that are not listed wastes D030
5	Liquid Waste	Water Containing Triethlyene Glycol Solid Waste
6	Liquid Waste	Water Containing Diethylene Glycol Solid Waste
7	Single Base Propellants	Propellant with Nitrocellulose and Lead D003, D008
8	Single Base Propellants	Propellant with Nitrocellulose D003
9	Single Base Propellants	Propellant with Nitrocellulose and Dinitrotoluene D003, D030
10	Double Base Propellants	Propellant with Nitrocellulose and Nitrate Esters D003
11	Double Base Propellants	Propellant with Nitrocellulose, Nitrate Esters and Perchlorate salts D003
12	Double Base Propellants	Propellant with Nitrocellulose, Nitrate Esters and Lead, D003, D008
13	Double base Propellants	Propellant with Nitrocellulose, Nitrate Esters and Solid Explosives D003
14	Triple base Propellants	Propellant with Nitrocellulose, Nitrate Esters and Nitroguanidine D003
15	Load, Assemble, & Pack Waste	Energetic materials from manufacturing cartridges D003
16	Single Base Propellants	Propellant with Nitrocellulose, Dinitrotoluene and Lead D003, D008

Group No.	Description	Defining Characteristics
17	Specialty Products Waste	Propellant with Nitrocellulose, Nitrate Esters, Nitroguanidine, Solid Explosives, or Appendix 3.6 Constituents D003
18	Specialty Products Waste	Propellant with Nitrocellulose, Nitrate Esters, Nitroguanidine, Solid Explosives, and Appendix 3.6 Constituents, Chlorides or Perchlorates D003
19	Specialty Products Waste	Propellant with Nitrocellulose, Nitrate Esters, Nitroguanidine, Solid Explosives, and Appendix 3.6 Constituents or Metals D003, D004-D010

Table II.E-2 - Notification Action Summary

ON-SITE Emergency Coordinators
Contacts to be made include:

Emergency Coordinator	Office Phone	Home Phone	Home Address
Plant Dispatch	(540) 639-8289	NA	NA
Plant Fire	(540) 639-7323 (non-emergency) (540) 639-7163 (emergency)	NA	NA
Environmental Emergency On-Call Representative **(Primary EC)**	540-230-8970	NA	NA
Safety On-Call Representative (**Alternate EC)**	Security will Contact	NA	NA
Environmental Manager (**Alternate EC)**	Withheld for security purposes. Security will contact. [1]		Withheld for security purposes [1]
Environmental Lead Specialist Hazardous Waste (**Alternate EC)**	Withheld for security purposes. Security will contact. [1]		Withheld for security purposes [1]
Safety, Health & Environmental Manager (**Alternate EC)**	Withheld for security purposes. Security will contact. [1]		Withheld for security purposes [1]

[1] In order to enhance the protection of defense services and defense articles and protect the unauthorized export of defense information under the International Traffic in Arms Regulations (ITAR), promulgated in Title 22 Code of Federal Regulations (CFR) Parts 120 through 130, the actual contact information of individual persons or contractors in the employ of RFAAP have been withheld from this Permit. This information is readily available for review and inspection at the facility upon request. The relevant data is also readily available to plant security and supervision to respond to an emergency.

ON-SITE Notifications

In addition to the notifications listed above, the EC or a designated representative should provide notification of all major emergencies to the environmental and operations management team.

OFF-SITE Notifications

To be made by the Environmental Manager or a designated representative as needed:

1. Army Administrative Contracting Officer – Operations Division Chief Cell (540) 239-4475
2. Virginia Department of Environmental Quality Blue Ridge Regional Office 540-562-6700
3. National Response Center (for releases above an RQ) 1-800-424-8802
4. Virginia Department of Emergency Management 1-800-468-8892
6. Montgomery County Local Emergency Planning Committee (LEPC) (540) 382-2951

7. Pulaski County Local Emergency Planning Committee (LEPC) (540) 980-7705
8. Emergency Service Resources (Fire, Ambulance, Police) 911

Table II.E-3 - Emergency Equipment Locations at RFAAP

Location # on Figure 5	Location Description	Equipment Available [1]
1.	Bldg. 1034, Electric Shop	Rubber gloves and respirators
2.	Bldg. 1039, Change House	Self-contained breathing apparatus (2)
3.	Roads and Grounds Bldg	Respirators, goggles, air fed respirators, safety belts, shoe cleats, air compressors (250 and 700 CFM ratings), portable pumps (50, 100, and 700 GPM capacities), cranes, bulldozers, movers, graders, tow tractors, portable electric generators
4.	Bldg. 1908, Material Storage	Absorbent materials and booms
5.	Bldg. 350, Fire Department	Ladder truck, engine, utility truck, brush truck, ATV’s, command vehicle, and ambulance.
6.	Bldg. 222, B Line Fire Station	HAZMAT trailer with response gear, special operations trailer, and 2 boats.
7.	Bldg 201, Main Laboratory	Nitroglycerin remover
8.	Warehouse No. 9387-2	Soda ash
9.	Bldgs. 440 and 441 Incinerators	Fire Extinguishers, eye wash and safety shower, and smoke detectors
10.	Bldg. 442, Grinder Building	Telephone access, fire extinguisher, and deluge-type fire suppression system
11.	Bldg 4601-7, Rest House	Telephone access and spill cleanup equipment

[1] All fire extinguishers located in the permitted treatment and storage area are multipurpose dry chemical type, charged to approximately 9 pounds of pressure.

Table II.E-4 - Evaluation Criteria for Implementation of the Contingency Plan

In accordance with the Contingency Plan Implementation Logic Diagram (Figure II.E-5), the following are examples of when the contingency plan would need to be implemented:

For a fire and/or explosion:

- If the fire causes a release of toxic fumes that go off plant or impacts personnel
- If the fire could spread (is not contained), thereby possibly igniting materials in other locations on-site or off-site, or could cause heat induced leaks or explosions
- If the use of fire suppressant could result in contaminated runoff that cannot be contained.
- If an explosion has or could:
  - Result in damage from flying fragments or shock waves
  - Ignite other hazardous waste at the facility
  - Release toxic materials that could cause harm to human health or the environment or cannot be contained.
- Or if a fire or explosion endangers human health or the environment for any other reason.

For spills or material releases

- If a spill endangers human health or the environment.

Table II.E-5 - Spill Response Measures

The spill response program will be coordinated by the Emergency Coordinator or designated representative. Guidelines are provided concerning safety, containment, evaluation, notification, treatment and monitoring as related to each spill incident.

1. Safety

   a. Evaluate the hazard of the spilled chemical to personnel that may be involved in containment, clean up, treatment and monitoring operations.

   b. Assure proper clothing and protective equipment is available and used by personnel involved in the spill response.

2. Containment

   a. Establish the expected flow path of the spilled material.

   b. Locate the nearest proposed damming site.

   c. Erect a dam –- notify Roads and Grounds regarding construction of dam.

3. Evaluation of Spill Extent

   a. Obtain pH readings at site if chemical spilled was an acid or base.

   b. Confirm stoppage of leak at source.

4. Initial Notification

   a. Delegated to the Emergency Coordinator

   b. Notify appropriate agencies (see Notification Action Summary)

5. Treatment

   a. Straw or other absorbers will be supplied to entrap hazardous wastes that are spilled. Sites/locations within the plant containing straw and other entrapment materials are controlled by Roads and Grounds.

6. Monitor Program

   Upon receiving notification of an accidental loss to the industrial sewer or surface streams, personnel will obtain grab samples at specified locations and time intervals as determined by the Emergency Coordinator.

   a. In-Plant Sites

      i. Suggested sampling sites will be determined based on the location of the spill

      ii. Samples will be collected at internal locations as designated.

   b. New River Site

      i. Sampling at the New River site will be performed on a staggered basis since the river flow approximates one mile per hour. Sampling will be performed by the operator at Building 4330.

7. Final Treatment

   a. Determine disposition of impounded material depending on type and quantity of spill. Ensure EPA and DEQ concur with disposition.

   b. Provide monitoring for duration of disposition.

Explosion fragments and materials as well as contaminated soils will be analyzed for explosives and nitroglycerine using either the RFAAP TAL's VELAP approved methods, or, if targeted for offsite analysis, SW846 Method 8332 for explosives and 8330 for nitroglycerine. If the analyses indicate that the materials are reactive, they will be handled as hazardous waste. Hazardous soils and residual reactive wastes will be treated at the OB Ground or sent off-site for disposal. If the analyses indicate that the materials are non-reactive, they will be decontaminated if necessary in the decontamination oven or the decontamination incinerator on-site at RFAAP and will then be disposed of in a permitted landfill or as decontaminated scrap.

Appendix II.E-1

Mutual Assistance Agreements

TABLE 1
MUTUAL ASSISTANCE AGREEMENTS WITH LOCAL MUNICIPALITIES

ENTITY	DATE OF AGREEMENT	SERVICES INCLUDED
City of Radford	July 11, 2011	Firefighting equipment and personnel
Montgomery County	October 19, 2020	Emergency and medical services personnel
Pulaski County	October 19, 2020	Emergency and medical services personnel
United States Army Research, Development, and Acquisition Information Services Activity	June 26, 1992	Force-Protection Support Responsibilities

Appendix II.E-2

Contingency/Emergency Plan Requirements for Hazardous Waste Management in the RFAAP Waste Accumulation Areas and the Explosive Waste Incinerators

Accumulation/ Treatment Area	Type of Management1	Waste Properties 2
Nitroglycerin	< 90-day containers (3 Satellite Accumulation areas)	D001, D003
Rocket	< 90-day containers (4 Satellite Accumulation areas)	D001, D003, D008
Magazine	< 90-day containers (7 Satellite Accumulation areas)	D001, D003, D004-D010, D030
Explosive waste incinerators	Thermal treatment, tank storage, and < 90-day containers (1 Satellite Accumulation area)	D001, D003, D004-D011, D030
Green Lines	< 90-day containers (5 Satellite Accumulation areas)	D001, D003, D008, D030
Finishing	< 90-day containers (5 Satellite Accumulation areas)	D001, D003, D008, D030
First Rolled Powder	< 90-day containers (2 Satellite Accumulation areas)	D001, D003, D008
Fourth Rolled Powder	< 90-day containers (5 Satellite Accumulation areas)	D001, D003, D008
New River Energetics (NRE)	< 90-day containers (2 Satellite Accumulation areas)	D001, D003, D004-D010, D030
Medium Caliber Ammunition Lap	< 90-day containers (5 Satellite Accumulation areas)	D001, D003
Sample Prep	< 90-day containers (2 Satellite Accumulation areas)	D001, D003, D004-D011, D030
Main Laboratory Building 201	< 90-day containers (4 Satellite Accumulation areas)	D001, D003, D004-D011, D030

Accumulation/ Treatment Area	Type of Management1	Waste Properties 2
IBL (Internal Ballistic Laboratory)	< 90-day containers (1 Satellite Accumulation Area)	D001, D003, D004-D010, D030

[1] Please note that the number of satellite accumulation areas in each area may change without a permit modification. A list of the exact locations of the <90-day accumulation areas and specific type of materials managed within them is maintained on-site in the facility operating record per Condition II.I.d.x)

[2] Codes shown represent those RCRA codes that the waste **may** exhibit. Not all of the specified codes may apply to every container of waste in the specified location.

Attachment II.Ea - Contingency Plan for the EWI-CWP Complex

II.Ea.1. Introduction and General Information

This Contingency Plan (Plan) has been prepared pursuant to 40 CFR §270.14(b)(7) for the Energetic Waste Incinerator and Contaminated Waste Processing facility (EWI-CWP) at the Radford Army Ammunition Plant (RFAAP). The information provided herein is also applicable to the central accumulation areas throughout the RFAAP, as the materials stored at these locations are the same as those stored and treated in the units covered by this Permit.

The list of central accumulation areas will be maintained onsite in the operating record per Condition II.I.2.d.x. The list of accumulation areas is dynamic and subject to change as waste generation and management needs warrant. Additional central accumulation areas may be established in accordance with 9 VAC 20-60-262.B.4 and without modification of this Permit.

This Plan has been compiled as a stand-alone document for the EWI-CWP complex at the RFAAP and has been structured to be consistent with other plans and procedures in use at the RFAAP.

II.Ea.1.a. Purpose

In accordance with 40 CFR §§ 264.50 through 264.56, this document describes the Contingency Plan that will be activated in the event of a fire, explosion, or release of hazardous waste or hazardous waste constituents that could threaten human health or the environment. A current copy of the Plan will be maintained in the RFAAP facility operating record as well as in the Environmental Manager's files.

The overall objective of this Contingency Plan is to minimize hazards to human health or the environment from fires, explosions, or any unplanned sudden or non-sudden release of hazardous waste or hazardous waste constituents to air, soil, or surface water. This plan defines the actions to be taken in the event of an emergency within the EWI-CWP complex at the RFAAP.

II.Ea.1.b. Plan Contents

This Contingency Plan contains pertinent information to be used during an emergency situation and was developed in accordance with 40 CFR §270.14(b)(7) and the sections referenced herein. The various sections and content of the plan are listed below along with the regulatory provision directing their inclusion.

- Section II.Ea.2 describes facility operations and the types of hazardous wastes managed at the EWI-CWP (40 CFR §264.56);
- Section II.Ea.3 identifies the RFAAP Emergency Coordinator and alternates (40 CFR §§264.52 and 264.55);
- Section II.Ea.4 discusses Contingency Plan implementation (40 CFR §§264.52 and 264.56);
- Section II.Ea.5 presents a description of release prevention measures (40 CFR §264.56);
- Section II.Ea.6 describes emergency response procedures (40 CFR §264.56);
- Section II.Ea.7 describes coordination agreements between RFAAP and surrounding communities (40 CFR §§264.37 and 264.52);
- Section II.Ea.8 presents the EWI-CWP evacuation plan (40 CFR §264.52);
- Section II.Ea.9 outlines release-reporting requirements (40 CFR §264.56); and
- Section II.Ea.10 includes requirements for Contingency Plan modifications (40 CFR §264.53).

II.Ea.2. Facility Location, Operations and Wastes Managed

This section provides background information that may be useful as part of an emergency situation. This information includes the location of the facility, operations performed at the facility, types of wastes managed, and potential emergency situations that could be encountered.

II.Ea.2.a. Facility Location

The RFAAP is located in southwest Virginia within Pulaski and Montgomery Counties as shown in Figure II.Ea-1. The RFAAP is located approximately 5 miles northeast of the City of Radford, 10 miles west of Blacksburg, and 47 miles southwest of Roanoke. The main entrance to the RFAAP is located on Virginia Route 114 between the Towns of Christiansburg and Radford. The RFAAP address is as follows:

Radford Army Ammunition Plant
4050 Peppers Ferry Road
Radford, Virginia 24141

The RFAAP encompasses approximately 4,104 acres. The New River separates Pulaski and Montgomery counties and also divides the RFAAP into two portions commonly known as the Horseshoe Area and the Main Manufacturing Area. These two areas and the approximate boundary of the RFAAP are shown on Figure II.Ea-1.

The EWI-CWP complex is located within the north central portion of the Horseshoe Area as shown in Figure II.Ea-1 and is used for the incineration of hazardous and contaminated energetic wastes. Figure II.Ea-2 shows the EWI-CWP complex and the locations of each storage and treatment unit within the complex. Figure II.Ea-3 through Figure II.Ea-5 provide an overview of how the wastes are processed through the EWI-CWP complex.

II.Ea.2.b. Facility Operations

General operations performed at the RFAAP in the central accumulation areas and the EWI-CWP complex are described in the following sections.

i RFAAP Operations

RFAAP is a government-owned, contractor-operated (GOCO) industrial installation operated by BAE Systems, Ordnance Systems Inc. (BAE) and responsible to the U.S. Army. The RFAAP's mission is to manufacture propellants, explosives, and chemical materials as assigned. As a GOCO operation, RFAAP has both Government and Contractor organizations. For the purpose of this permit application, the facility consists of all contiguous portions of the RFAAP. The facility specifically includes both the Horseshoe Area and the Main Manufacturing Area. Wastes from onsite activities (including those of both the operating contractor and tenants) are temporarily stored in central accumulation areas and treated in the EWI-CWP complex.

The facility was first constructed in 1940 and began operations producing smokeless powder (single base, double base, and triple base propellants) in 1941. Since that time various processes/products have been added to the facility including production of cast propellants, trinitrotoluene (TNT), commercial propellants, and load, assemble and pack facilities. Specific operations vary based upon contracted capacity and products from the Department of Defense and U.S. allies.

ii EWI-CWP Operations

Hazardous waste operations included in the EWI-CWP complex include grinding, tank storage, and thermal treatment. The primary structures included in the complex are as follows:

- The Grinder Building (identified as Building 613), where wastes are transported prior to treatment and are ground into small pieces prior to being mixed into the slurry and incinerated in the rotary kiln incinerators. The Grinder Building houses the permitted hazardous waste storage tanks, including the makeup water tank, the decant water tank, and the three kiln storage tanks, as well as the grinder tanks. The other tanks housed within the Grinder Building (the firewater collection tanks) are not hazardous waste storage or treatment tanks. The Grinder Building also includes a SWECO vibratory separation system that can be used to prepare the wastes for offsite shipment if necessary.

- Rotary Kiln Incinerators 616 and 617, where the slurried wastes are thermally treated in accordance with this Permit, the applicable RCRA requirements, and the requirements of the Hazardous Waste Combustor National Emission Standards for Hazardous Air Pollutants (HWC NESHAP);

- The Contained Burn Chamber (CBC) (Account 615-CBC-50202), where hazardous wastes that cannot be slurried are thermally treated in accordance with this Permit, the applicable RCRA requirements, and the HWC NESHAP; and

- The CBC and Car Bottom Storage/Loading Building (henceforth referred to as the Loading Building and identified as Building 614), where hazardous wastes are brought prior to treatment and are configured into batches for treatment in the CBC and where metal items targeted for decontamination are loaded onto carts for the Car Bottom Oven.

In addition, the following additional accounts are located within the area. These buildings or units do not manage hazardous wastes but are associated with the overall operations of the facility:

- The Car Bottom Oven (Account 615-R-50006), where large pieces of metal, such as production equipment and piping, are decontaminated in accordance with the State of Virginia Air Pollution Control Laws (the treated items are not hazardous wastes);

- The Operations Control Center (OCC) Building, identified as Building 610, where operators direct remote operation of the Grinder Building, the rotary kiln incinerators, the CBC, the Car Bottom Oven, and the Small Decontamination Oven;

- The Maintenance Storage Building, identified as Building 611, where parts and pieces of the thermal treatment systems and ancillary equipment are brought for maintenance; and,

- The Motor Control Center (MCC) Building, identified as Building 612, where all of the programmable logic controllers (PLCs) and controls for the various system components are housed.

In addition to the buildings referenced above, numerous central and satellite accumulation areas have been established in buildings throughout the RFAAP. Although these accumulation areas are not managed under this Permit, the wastes stored within them and the procedures to be used in responding to emergencies at them are consistent with the wastes and procedures herein. Therefore, this Contingency Plan is intended to cover both the EWI-CWP complex and the central accumulation areas. A comprehensive listing of all the central and satellite accumulation areas will be maintained in the facility's operating record.

While the site-specific hazards, (*e.g.*, releases of hazardous waste, worker exposures, fire and explosion hazards) may vary for each area, spill response and removal actions are generally the same. For liquid spills response actions include containing the spill with cloth wipes, Pigs®, or sawdust, and contacting supervision for further instructions. For most solid spills, operations will be stopped and supervision will be contacted for further instruction. (Please note that a list of the specific buildings used for central accumulation areas and the specific type of wastes contained in those areas (*e.g.,* propellants, ignitable and reactive liquids) is required to be maintained onsite per Condition II.I.2.d.x and will be made available for inspection as requested).

Specific operations that are performed at the EWI-CWP complex are described below. Figures II.Ea-3 through Figure II.Ea-5 show how the wastes are processed through the complex.

1. Waste materials are transported from production areas in up to 20-gallon containers to one of several central accumulation areas. These areas are outside of the EWI-CWP complex. (Note: the wastes are accumulated for no more than 90 days and therefore these buildings are not permitted container storage facilities).

2. At the Grinder (Building 613), waste tubs are loaded onto a conveyor and processed with ample amounts of water through a grinder and cutter to ensure a uniform particle size for treatment in the rotary kiln incinerators. This same grinding system is used along with the SWECO system if it is necessary to ship wastes offsite. When being treated onsite, the slurried wastes flow into one of three slurry tanks for storage prior to treatment in the incinerators. These slurry tanks are not completely emptied every 90 days; therefore, these tanks have been permitted as greater than 90-day

hazardous waste storage tanks. Water for grinder operations is provided either by the plant process water system (fresh water) or contaminated water stored in the makeup water tank. The contaminated water is generally non-hazardous but the tank is managed as hazardous waste storage out of an abundance of caution.

3. Once selected for treatment, slurried wastes are circulated first through an in-building recirculation loop and then through an external recirculation loop. The external loop supplies feed to both of the rotary kiln incinerators. With the loop, operators can feed one or both of the rotary kiln incinerators a continuous supply of slurried wastes for treatment. Each incinerator is equipped with an extensive air pollution control (APC) system that is used to treat the resulting emissions prior to discharge to the atmosphere.

4. Those wastes that cannot be processed through the grinder are taken to the Loading Building and loaded into bays for batching to the CBC. These container storage areas operate as staging areas for the CBC only and do not store wastes on any type of long-term basis. Therefore, they are not permitted as container storage areas.

5. From the Loading Building, wastes are loaded into a tray and are transferred to a relay system that moves the wastes from the Loading Building out to the CBC. A remotely operated transfer system at the CBC is used to load the tray of wastes into the CBC. Once loaded into the CBC, the wastes are batched through a thermal treatment cycle and the resulting off-gas is bled at a controlled rate to the downstream afterburner and then through ductwork to the incinerators' secondary combustion chamber and APC equipment. Either incinerator is able to receive the off-gas stream from the CBC depending on which system is operating. Precautions are in place to make sure that CBC off-gases are not transferred to a non-operating incineration system.

6. Residue from the rotary kiln incinerators is collected in the kiln wet ash system and under the baghouse in a 55-gallon drum. Residue remaining in the CBC pans is vacuumed from the pans and collected in a 55-gallon drum at the Loading Building. Once full, these drums are transferred to the central accumulation area located in the EWI-CWP complex. The ash is staged onsite pending sample analysis and is then disposed in a properly permitted offsite disposal facility.

7. Non-hazardous contaminated combustible wastes are loaded into the kilns through a conveyor and shredder assembly located at each kiln. As required by the HWC NESHAP, each container is weighed and recorded prior to entering the kiln shredder assembly.

8. Non-hazardous contaminated metallic items are transported to the Loading Building prior to decontamination. The wastes are then transferred manually or with the assist of a forklift to the Car Bottom Oven and decontamination oven to facilitate decontamination of the items before they are either recycled or disposed.

II.Ea.2.c. Wastes Managed

The wastes that are stored and treated in accordance with this Permit are hazardous due to their ignitability (D001), reactivity (D003), and/or toxicity for certain metals and organics. In addition, several listed wastes may be treated in the EWI-CWP complex. These include discarded commercial chemical products that result from spills in the various process areas or other commercial chemical products that are unsuitable for use. Only those hazardous wastes that are within the specifications of the facility's RCRA Permit and the Waste Analysis Plan will be stored and treated in the permitted storage and treatment area. Neither radioactive wastes, nor mixed radioactive and hazardous wastes will be stored or treated at the EWI-CWP complex.

In general, the wastes that are stored and treated at the EWI-CWP complex include wastes that exhibit the following hazardous characteristic(s):

i. Ignitability (hazardous waste number D001) as specified in 9 VAC 20-60-261, incorporating 40 CFR §261.21 by reference;

ii. Toxicity, as specified in 9 VAC 20-60-261, incorporating 40 CFR §261.24 by reference, for one or more of the following contaminants:

a. Arsenic (hazardous waste number D004);

b. Barium (hazardous waste number D005);

c. Cadmium (hazardous waste number D006);

d. Chromium (hazardous waste number D007);

e. Lead (hazardous waste number D008);

f. Mercury (hazardous waste number D009);

g. Silver (hazardous waste number D011); and

h. 2,4-Dinitrotoluene (hazardous waste number D030).

iii. Reactivity (hazardous waste number D003) as specified in 9 VAC 20-60-261, incorporating 40 CFR §261.23 by reference.

In addition, several listed wastes may be treated at the EWI-CWP complex. These wastes result from spills of commercial chemical products used at the RFAAP, or other situations that result in the commercial chemical products being discarded. These wastes are not routinely treated in the units, but may be treated from time to time as required and include:

i. Nitroglycerin (P081)

ii. Acetone (U002)

iii. Dibutyl phthalate (U069)

iv. 2,4-Dinitrotoluene (U105)

v. Ethyl ether (U117)

A specific list of those wastes permitted for storage and treatment at the incinerator area is provided in Table II.Ea-1. As shown in the table, the wastes are classified into one of 28 different waste groups that are described in detail in the Waste Analysis Plan in Attachment II.Ba. These group numbers were assigned as the information on the waste groups was collected. There is no significance to the order of the group numbers in Table II.Ea-1.

i. Composition of Waste

The composition of the wastes treated at the EWI-CWP complex varies over time due to changes in the production schedule at the RFAAP. However, all of the wastes can be categorized into one of the 28 waste groups identified in Table II.Ea-1. This table identifies each waste group number and specifies the RCRA hazardous waste codes that may be applicable to that group. Information on the 40 CFR §261, Appendix VIII constituents that may be present in each group is provided in Table IIa of Appendix II.Ba-1.

If the Permittee wishes to store or treat waste whose formulation is not consistent with one of the groups identified in Table II.Ea-1 in the EWI-CWP complex, the Permittee shall submit a request for permit modification.

ii. Identification and Quantity of Waste

The specific identification of wastes to be stored and treated at the EWI-CWP complex is recorded on an internal tracking form that accompanies the waste from the generation area. This permits easy identification of any material that is released. In the event of a release, the information provided on this internal tracking form and corresponding waste tag will be the primary means for identifying the material that has been spilled or otherwise released. These internal tracking forms and tags accompany each container of waste that is generated and transferred within the RFAAP. Should material from a hazardous waste storage tank, the slurry loop, or any of the thermal treatment units be released, information from the grind makeup sheet will be used to identify the materials that were present in the tank or piping at the time of release.

The quantity and location of hazardous wastes that are maintained onsite at the EWI-CWP complex are listed below:

- Grinder Building (Bldg 613):

  - Up to 18,000 gallons of waste slurry in three 6,000-gallon hazardous waste storage tanks, 10,450 gallons of potentially hazardous liquid waste in the make-up tank, and up to 13,100 gallons of potentially hazardous waste in the decant tank (note that the wastes in the makeup tank and decant are treated as hazardous out of an abundance of caution and will likely be non-hazardous water-based solutions);

  - Accumulated waste awaiting processing in the Grinder Building (quantity varies based on production schedule but can be up to 6,000 pounds, including the waste on the conveyor and the waste in the staging area);

  - Note that at no time may the energetic material in the building exceed 6,000 pounds whether the material is mixed into a slurry, processing through a grind, or being staged for a subsequent grind;

- Accumulated waste awaiting processing in the CBC Loading Building bays (maximum quantity at any one time in this building is 1,200 pounds);

- Potentially hazardous waste ash in satellite accumulation in the thermal treatment systems, including up to one, 55-gallon drum of kiln ash per kiln system, one, 55-gallon drum of baghouse ash per kiln system, and one 55-gallon drum of CBC ash at the Loading Building; and

- Potentially hazardous waste ash stored in the central accumulation area adjacent to the Loading Building (with storage of up to 152, 55-gallon drums).

II.Ea.2.d. EWI-CWP Potential Emergency Situations

There are several situations that could lead to the release of hazardous waste at the EWI-CWP complex that would require implementation of the Contingency Plan. The most common scenarios that could lead to such a release of hazardous waste are listed below:

1 Release of hazardous waste slurry due to slow leak or failure of a hazardous waste storage tank, slurry piping, and/or slurry pump failure.

2 Release of hazardous waste slurry during transfer to slurry or makeup water tanks.

3 Release of hazardous solid waste during transfer or processing in the Grinder Building or Loading Building, such as that resulting from a waste conveyor system failure or operator spill.

4 Release as the result of a fire or an explosion of reactive wastes during processing or handling, such as that which could result from metal entering the grinding system due to a metal detector failure.

5 Release of hazardous solid waste resulting from a malfunction of the tray loading system on the contained burn chamber (CBC) system.

The most serious situation at the EWI-CWP complex would be an explosion, as such an incident would pose an immediate danger to facility personnel and could allow for the release of a significant quantity of material. A non-explosive release of waste at the EWI-CWP complex presents less of an immediate danger to personnel, but response measures are still important as a safety issue for facility personnel and as a long-term issue for protection of human health and the environment.

II.Ea.3. Emergency Coordinators

The primary Emergency Coordinator (EC) for all environmental emergencies is the on-call representative from the Environmental Department. Additionally, the facility Incident Site Commander (ISC) will provide coordination of emergency response such as fire protection, medical attention, *etc*. The EC has the authority to determine and implement this Contingency Plan and commit the necessary resources to do so. The EC will receive assistance in these duties from the ISC where appropriate.

The facility has an onsite Fire Department. Environmental emergencies are primarily communicated to and handled by the Environmental Manager and the Environmental Staff in accordance with applicable regulations. The Environmental Manager coordinates all pollution control and remediation activities including monitoring, containment, control, countermeasures, clean-up, and disposal activities.

Other facility employees are designated as alternate ECs and are qualified to act as the EC in event the primary EC is unavailable. A (primary or alternate) EC will be available or on call at all times. The facility personnel who are designated as ECs are listed in Table II.Ea-2 (the Notification Action Summary sheet). The alternate ECs are called on to act as the EC in the event of an emergency in the order listed in the table.

All of the persons identified as ECs (primary or alternative) are qualified by experience and training to act as the EC. All of these persons hold management positions at the facility, have been trained to respond to emergencies dealing with hazardous waste management, and have extensive experience in the propellant manufacturing environment.

In order to enhance the protection of defense services and defense articles and protect the unauthorized export of defense information under the International Traffic in Arms Regulations (ITAR), promulgated in 22 CFR Parts 120 through 130, the actual names and contact information of individual persons designated as an EC (primary or alternate) have been withheld from this Permit. This information is readily available for review and inspection at the facility upon request. The relevant data is also readily available to plant security and supervision to respond to an emergency.

II.Ea.4. Implementation

The Contingency Plan will be implemented whenever there is a fire, explosion, or release of hazardous waste or hazardous waste constituents that could threaten human health or the environment. The EC will be responsible for evaluation of any situation to determine if the Contingency Plan will be implemented. Situations that could require implementation of the Contingency Plan include:

1. Fire and/or Explosion - The primary hazards that accompany explosions and deflagrations are blast overpressure, fragmentation (primary and secondary), and thermal effects. Such instances would require implementation of the Contingency Plan if:

    a. A fire causes the release of toxic fumes.

    b. The fire spreads and could possibly ignite materials at other locations onsite or could cause heat-induced explosions.

    c. The fire could possibly spread to offsite areas.

d. The use of water and/or chemical fire suppressant could result in contaminated run-off.

e. An imminent danger exists that an explosion could ignite or initiate other hazardous waste because of flying fragments or shock waves.

f. An imminent danger exists that an explosion could ignite or initiate other hazardous waste at the facility.

g. An imminent danger exists that an explosion could result in release of toxic material.

h. An explosion has occurred that has released toxic material.

2. Spills or Natural Release

a. The spill could result in release of flammable liquids or vapors, thus causing a fire or gas explosion hazard.

b. The spill could cause the release of toxic liquids or fumes.

c. The spill can be contained onsite, but the potential exists for contamination of the soil or groundwater.

d. The spill cannot be contained onsite, resulting in offsite soil contamination and/or ground or surface water contamination.

It shall be the duty of all facility personnel to follow the direction of the EC when the decision has been made to implement the Contingency Plan.

The person observing an emergency situation at the EWI-CWP will most likely be someone other than the EC. That person is to take the following actions to involve the EC as soon as possible:

1. Ensure his/her personal safety.

2. Activate the emergency warning alarm system if the incident occurs at the within the EWI-CWP complex.

3. Telephone, radio, or otherwise notify the OCC of any observed releases (*e.g.*, spills, fires, or explosions) and report: his/her name, location, and nature and extent of the release. The control room personnel will immediately notify the Security Dispatcher and the Foreman. The Security Dispatcher will immediately notify the EC via the Environmental on-call phone.

4. Remain available to assist the EC with information about initial observations of the incident.

II.Ea.5. Release Prevention Measures and Control Procedures

RFAAP has general facility-wide control procedures to minimize the potential for fires, explosions, and chemical releases as part of overall facility operations. Additional measures have been implemented at the EWI-CWP complex to prevent and/or control the propagation of such incidents.

II.Ea.5.a. RFAAP Control Procedures

The RFAAP is designed so that process, raw material storage, and product storage facilities present a minimal threat of fire, explosion or material release. These process and storage operations are not subject to regulation under this Permit. However, in the course of normal operation and maintenance, hazardous wastes are generated. Because safeguards exist for the non-Permit regulated processing operations, this also protects against hazards once the waste is generated in the plant.

In the event of a fire, explosion or spill involving hazardous waste, the EC will notify the area foreman to direct personnel to contain, absorb, package, or redirect spilled materials as deemed necessary to protect human health or the environment. For this purpose, the plant maintains an adequate supply of hand and motorized tools and clean, empty containers for recovering spilled hazardous wastes.

The EC has the authority to direct trained fire crews to contain and control fires and cool affected areas to prevent further spread of hazard. This direction shall be coordinated through the onsite plant fire chief.

II.Ea.5.b. EWI-CWP Operating Procedures

Standard operating procedures for the EWI-CWP systems include provisions for monitoring and shutdown of the treatment and processing equipment. Process operations are monitored remotely from the OCC and include safety features to ensure safe operation of each unit. Should an emergency situation occur at the EWI-CWP, the affected system will be shutdown to prevent danger to human health or the environment.

II.Ea.5.c. Prevention of Recurrence or Spread of Fires, Explosions or Releases

Numerous precautions are taken in the central and satellite accumulation areas and the permitted storage areas and at the EWI-CWP complex to reduce the likelihood of fires, explosions, or other unsafe conditions. These precautions take the form of engineering controls and procedural methods to either help prevent a fire or reduce the spread or damage caused by it. A summary of these procedures is provided in the section that follows.

Sprinklers and other types of fire suppression systems, when activated, automatically provide notification to the RFAAP Fire Department. These systems are activated automatically if a fire is sensed and may also be manually activated by the operators if necessary. In addition, fire extinguishers are on hand for immediate use (refer to Section II.Ea.6c of this Plan for a complete list and location of available emergency equipment).

Barricades within the EWI-CWP complex have been designed in accordance with DOD standards to help prevent the propagation of explosions due to flying fragments impacting nearby operations at the facility, and units have been spaced to minimize blast propagation from one unit to the other. In addition, a number of measures have been implemented to prevent and/or control the spread of fires, explosions, or other releases as noted below:

1 The waste slurry stored in the tanks and pipes is an aqueous mixture of energetic wastes. The grinding of the waste energetic to form an aqueous slurry helps prevent the occurrence of fires and explosions. This also allows for a closed loop feed system to the to the rotary kiln incinerators and minimizes the operator handling of the waste materials.

2 Operating procedures for shutting down the grinding operations are part of the facility's plant emergency procedures. These procedures are designed to help prevent the release of hazardous wastes should a system upset or malfunction occur.

3 Secondary containment systems for each of the hazardous waste storage tanks (described in Section II.Ea.6e) help prevent any released material from entering the environment.

4 Process equipment in the Grinder Building includes a grinder fail-safe system, which flushes the slurry lines with water in order to clear the lines of residual slurry and prevents loading of new material into the system. The fail-safe system includes the following functions:

   a. Shutdown of EW waste conveyor feed system in the event of the loss of compressed air, level deviation in the grinder tank, failure of a grinder component, or loss of flow indication through the grinder pump.

   b. Shutdown of the grinding system in the event of a loss of compressed air, level deviation in the grinder tank, failure of a grinder component, loss of flow indication through the grinder pump or high amperage on either the grinder or the cutter.

c. Automatic flushing of the slurry piping system in the event of a power failure, conveyor shutdown, or grinder component failure.

Thus, if the facility operations are stopped, the lines will be cleared of waste slurry. Should a breach of the tank or loop occur, all released slurry will be collected in the secondary containment systems. After the slurry lines flush, the operators turn off the fail-safe system, evacuate to the control room, and monitor the fail-safe system and system controls during an emergency response.

5 The Grinder Building is bermed and protected with a counterfort retaining wall that is designed such that an incident in the Grinder Building will not propagate to another unit within the complex.

6 The six storage bays within the Loading Building are designed with blast wall separation so that an incident in one bay will not propagate to another.

7 Fragmentation walls are provided adjacent to the CBC and kiln areas such that fragments from an event in one of these areas will not be ejected to surrounding areas and impact operations therein.

8 All areas that manage reactive waste are equipped with fire suppression systems to minimize the possibility of fires in one area expanding to impede upon another area of the complex.

Both the rotary kiln incinerators and the CBC have built-in safeguards against equipment failure during emergency conditions. These safeguards help prevent fires, explosions, and the release of waste slurry. Table II.Ea-3 provides information on the emergency shutdown scenarios for each system.

Should there be a fire, explosion, or release of hazardous materials at the EWI-CWP complex, the EC and other environmental and operational personnel will review the incident after response and clean-up activities are completed. Based on this review, the cause will be determined, if possible, facility operating procedures or design will be revised as necessary, and other corrective actions will be taken in order to help prevent a reoccurrence. The Contingency Plan will also be revised as necessary to improve facility response to future incidents.

II.Ea.6. Emergency Response Procedures

This section outlines procedures to be followed during an emergency at the EWI-CWP complex. Information on the EC responsibilities, the required notifications, control, cleanup, and mitigation procedures is presented. Specific emergency response procedures for each hazardous waste management area are provided in Appendix II.Ea-2.

II.Ea.6.a. Emergency Coordinator's Responsibilities

When the decision has been made to implement the Contingency Plan, the EC's responsibilities will include, but will not be limited to, the following:

1. Identifying hazardous materials and assessing hazards;
2. Accounting for facility personnel;
3. Implementing internal notifications;
4. Coordinating first-aid activities;
5. Controlling and monitoring site conditions;
6. Activating the Evacuation Plan, if required;
7. Notifying appropriate State and local authorities (coordinated with the Environmental Department);
8. Coordinating the storage, treatment, and disposal of released material; and
9. Providing post-emergency management.

II.Ea.6.b. Notifications

Procedures for the notification of RFAAP personnel and appropriate federal, state and local agencies are included in this section. The Notification Action Summary is provided in Table II.Ea-2 of this Contingency Plan. Should the EC be offsite at the time of the emergency, these notifications shall be made by the designated alternate EC or another onsite designee.

i Internal RFAAP Notifications

Internal communication systems (telephone or two-way radios) will be used to notify RFAAP personnel. The appropriate alarms will be activated and the EC will be notified in an effort to implement the Contingency Plan as outlined in Section II.Ea.4.

ii Notification of Federal, State, and Local Agencies

The Environmental Manager (or a designated alternate) will notify appropriate state and local agencies as outlined in this plan and as listed below.

In the event that a release occurs that could threaten human health or the environment outside the facility, the EC shall report his/her findings as follows pursuant to 40 CFR §264.56(d). Accordingly, the EC shall notify:

- The National Response Center at (800) 424-8802;
- The Virginia Department of Environmental Quality, Blue Ridge Regional Office, at (540) 562-6814 or (540) 562-6700;
- The Virginia Department of Emergency Management at (800) 468-8892; and
- The local emergency planning committee offices as follows:
  - The Montgomery County Local Emergency Planning Committee at (540) 394-2146 (ex. 4158) if the emergency is within Montgomery County; or
  - The Pulaski County Emergency Management Coordinator at (540) 980-7705 if the emergency is within Pulaski County.

Additionally, if the EC determines that an evacuation of local areas may be advisable, he/she shall immediately notify appropriate local authorities. The EC shall be available to help appropriate officials decide whether local areas should be evacuated.

In the event that an emergency situation occurs that requires notification of outside agencies, the following information shall be reported:

1. Name and telephone number of the notifier;
2. Name and address of facility;
3. Date, time, and type of incident;
4. Name and quantity of material(s) involved to the extent known;
5. The extent of injuries, if any; and
6. The possible hazards to human health or the environment outside the facility.

II.Ea.6.c. Emergency Equipment Available

The emergency equipment available and "on-call" for use at the unit is summarized in Table II.Ea-4 and Figures II.Ea-6 through II.Ea-12. The table also provides required specifications on referenced equipment (*e.g.,* fire extinguisher type and volume) when it is defined by the RFAAP safety and/or fire protocols. The numbers (1-10) in Table II.Ea-4 indicate the different physical locations. The locations specified are as shown on Figures II.Ea-6 and II.Ea-7. Specific emergency equipment provided for each building within the EWI-CWP complex is provided in Figures II.Ea-8 through II.Ea-12.

In addition to the equipment listed in Table II.Ea-4, other fire, personnel protection and cleaning equipment is available as follows. Fire protection equipment includes fire suppression systems, portable fire extinguishers, a mobile carbon dioxide extinguishing system, and fire hydrants at various locations within the plant. Cleaning equipment such as brooms, dustpans, and sawdust can be found in the Grinder Building (Building 613) and the Maintenance Building (Building 611). Additional spill cleanup equipment is located in the Roads and Grounds Building (Building 7217).

II.Ea.6.d. Containment, Countermeasures, Clean-Up and Disposal

The general response measures that will be implemented during an emergency situation at the EWI-CWP complex are presented below.

1. *Ensure Personal Safety, Sound Alarm and Notify Emergency Coordinator*: Upon identification of a fire, explosion, or other release personnel shall ensure their personal safety and then activate the alarm system and notify the EC. The alarm system consists of radio and telephone. Both forms of alarm are accessible throughout the EWI-CWP complex. The alarms will be used to contact the Security Dispatcher, which is staffed 24 hours a day, 7 days a week.

2. *Evacuation*: Personnel will evacuate the area as outlined in the Evacuation Plan in Section II.Ea.8 and as directed by the EC.

3. *System Shutdown*: In the event of a fire, explosion, material release or other system emergency, necessary operations will be shut down so that personnel can enter the area to respond.

4. *Identify the Material(s) Involved*: The specific identification of wastes will be determined from the internal manifest forms, which identify the materials that are sent to the EWI-CWP complex. Copies of the manifests are carried in the transport vehicles carrying the waste. Upon delivery to the treatment facility,

the manifests are transferred from the transport vehicles and are kept at the OCC.

5. *Assessment*: Upon arrival at the scene, the EC (or the designated alternate) will take control of the affected area including all resources necessary to deal with the emergency. The EC will maintain this authority and control until the emergency has been eliminated and cleanup is complete.

   After taking control of the affected area, the EC will determine the source, extent, and nature of the involved hazardous waste and assess any primary and secondary hazards. Waste generation, source and analytical data are to be used to make this determination. These records shall be kept onsite. The evaluation criteria used by the EC to determine if the Contingency Plan is to be implemented are presented in Table II.Ea-5. A logic diagram representing the evaluation process is shown as Figure II.Ea-13.

6. *Alert Local Authorities for Assistance*: Should the situation require resources beyond those available at the RFAAP, local fire, police, and/or medical support will be requested as described in Section II.Ea.7.

7. *Implement Spill Response Measures*: Spill response measures will be implemented as outlined in Table II.Ea-6 using the available spill response equipment listed in Table II.Ea-4 and materials provided by supporting communities as needed. Response measures include evaluation of safety issues, containment of the release, regulatory notifications, waste treatment, and monitoring. Response measures will be performed by the RFAAP Fire Department and Emergency Response Team under the direction of the EC with assistance from other local agencies as needed.

8. *Accumulation and Treatment of Released Material*: If a spill or leak occurs in the Grinder Building or the Loading Building, the released material will be contained in the secondary containment system. These containment systems all drain back to the Grinder Building and, from there, can be pumped to the make-up tank. If hazardous waste is released to the ground such as may occur due to a failure in the slurry feed line, applicable spill response measures outlined in Table II.Ea-6 will be followed. Recovered energetic waste will be treated at the open burning ground, if appropriate.

   Ash from fires will be treated similar to incinerator ash. The ash will be analyzed for reactivity, TCLP toxicity, and other constituents as specified in the Waste Analysis Plan in Attachment II.Ba of this Permit. If the ash fails for either or both characteristics or is a listed hazardous waste, it will be taken to a RCRA permitted facility or treated in the CBC. If it is not determined to be a hazardous waste, it will be disposed in an appropriately permitted solid waste landfill.

9. *Incompatible Wastes*: There are no wastes stored or treated in the EWI-CWP complex that are incompatible with one another. Therefore, the danger of the mixing of incompatible wastes during cleanup procedures is very unlikely. However, procedures are provided to each of the areas on how to prepare wastes for disposal. These procedures provide information on which wastes can be treated in each unit and provide directions on segregating those wastes accordingly. In addition, the procedures also provide instruction on how to properly tag and manifest the wastes to ensure they are properly identified and handled appropriately. These internal waste manifests and container tags serve to identify the wastes and their point of generation. Upon receiving the wastes, the EWI-CWP operators inspect the waste containers to confirm that they are properly labeled and manifested. They are also visually inspected to confirm that prohibited materials are not provided in the container.

II.Ea.6.e. Incinerator-Specific Response Measures

Specific measures for the hazardous waste storage tanks and for each of the thermal treatment systems are included in the following sections.

i Container Spills and Leakage

There are no permitted container storage areas within the EWI-CWP complex. However, both the Grinder Building and Loading Building may contain hazardous waste containers that are stored on a temporary basis. In addition, any of the satellite accumulation areas or the central accumulation area for ash may hold containers of hazardous waste at any time. With the exception of the waste in the baghouse satellite accumulation areas, each of these containers may contain free liquids.

In the event that one of these containers should spill or develop a leak, the spill will be immediately contained using sawdust. Ample sawdust will be added to completely absorb any liquid in the spilled materials. After the spill has been adequately contained, the material will be swept up and placed into a new hazardous waste storage container. The container will be labeled to clarify the contents of the container and an internal waste manifest will be completed. The collected material will then either be treated onsite within the EWI-CWP complex or will be shipped offsite to a properly permitted disposal facility if it cannot be treated onsite. If the spill resulted from a leaking or otherwise defective container, the container will be removed from service and disposed in accordance with all applicable laws and regulations.

ii Tank Spills and Leakage

In the event of a spill or release from the hazardous waste tank system, the released material should be contained in the secondary containment system. Tank and sump level indicators are monitored by operators in the control room. Should indication of a leak or spill be provided, a visual inspection of the area will be conducted immediately. Additionally, the secondary containment system is inspected every 24 hours to determine whether any leaks have occurred in accordance with 40 CFR §264.193(c)(3).

The containment system in the Grinder Building is sized as required to contain 100 percent of the largest tank or 10 percent of total volume of waste stored in all of the tanks. Any spill from one of the hazardous waste storage tanks will be directed to the Grinder Building sump and pumped to the makeup tank. Once characterized, it will be used as makeup water for a future grind.

Upon detection and visual inspection of a leak or spill, RFAAP will comply with all applicable requirements of 9 VAC 20-60-264 and 40 CFR §§264.196(a) through (f). Grinding operations feeding the leaking tank will immediately cease, and any leaking tank will be emptied. The spilled or residual waste from the sump will be transferred to the makeup tank. If solids are spilled, they will be placed into waste containers and removed. The collected wastes will either be sent to the CBC or worked into a future grind when incinerator operations resume. Waste that has leaked from a tank or that remains in the leaking tank will be removed from the leaking tank, containment system, and/or floor sump within 24 hours. Any leaking tank will be inspected, the cause of the failure determined, and the defect repaired pursuant to the requirements of 9 VAC 20-60-264 and 40 CFR §264.196(e), and certified by an independent Virginia registered professional engineer pursuant to 40 CFR §264.196(f) prior to being returned to service. In the event that a repaired tank is returned to service, the Director of the Virginia Department of Environmental Quality must be notified that the repaired tank has been returned to service within seven (7) days. If a leaking tank cannot be repaired, the tank system will be closed in accordance with 9 VAC 20-60-264 adopting 40 CFR §264.196(e) by reference unless any of the following conditions are satisfied:

- If the cause of the release was a spill that has not damaged the integrity of the system, then the owner/operator may return the system to service as soon as the released waste is removed and repairs, if necessary, are made.

- If the cause of the release was a leak from the primary tank system into the secondary containment system, the system must be repaired prior to returning the tank system to service.

- If the source of the release was a leak to the environment from a component of a tank system without secondary containment, the owner/operator must provide the component of the system from which the leak occurred with secondary containment that satisfies the requirements of §264.193 before it can be returned to service, unless the source of the leak is an aboveground portion of a tank system that can be inspected visually. If the source is an aboveground component that can be inspected visually, the component must be repaired and may be returned to service without secondary containment as long as the requirements of 40 CFR §264.196(f) are satisfied. If a component is replaced to comply with the requirements of this subparagraph, that component must satisfy the requirements for new tank systems or components in §§264.192 and 264.193.

In the event of a tank overfill/rupture or pipe rupture, standard procedures for handling a hazardous waste liquid spill containing energetic materials will be followed. Any contaminated equipment will be decontaminated and reused or decontaminated and disposed of as excess equipment or as hazardous waste, if appropriate. Spilled waste collected in containers will receive treatment as soon as one of the explosive waste incinerators is properly operating again. The waste will be kept at the facility's container management area in accordance with 9 VAC 20-60-262 and 40 CFR §262.30 through 34 until the time that treatment begins.

iii Incinerator Spills and Leakage

A release of materials from the slurry loop line or in the area of the incinerators may occur due to failure of the slurry line either by rupture or gasket failure. To mitigate the impact from a slurry loop failure, the entire loop is covered and underlaid by a concrete spillway. This spillway is designed to drain to the Grinder Building sumps. Spill response measures to such an incident are outlined in Table II.Ea-6. The EC will direct the spill response program. Procedures are provided in these tables and associated permit paragraphs concerning safety, containment, evaluation, notification, treatment, and monitoring as related to each spill incident.

The concrete slab on which each incinerator is sloped to a grated area that covers a sump that drains to the Grinder Building. Any slurry that may leak onto the slab will be washed into sump and will be pumped into the Grinder Building (Bldg. 613) and transferred to the make-up tank as described above. Response procedures to leaks or spills outside of the incinerator slab are outlined in Table II.Ea-6. Decontamination and repair of the unit will be accomplished depending on the type of repair required. For example, if welding is required, the material must first be decontaminated with heat. If welding is not required, the material can be decontaminated with water.

iv CBC Spills

The primary source of spills from the CBC are in the transfer of CBC trays from the transfer trolley system to the CBC loading trolley. Spills of materials from the trays are minimized by the use of tray covers. Each tray is affixed with a removable lid that stays secured to the CBC trays during transport and transfer. Only after the tray is transferred into the loading rack is the lid removed. All transfers between loading racks and cooling racks are made over secondary containment areas or concrete pads. Therefore, any materials that may be spilled should be contained on the pad and removed before they can contaminate the environment.

II.Ea.6.f. Disposal of Miscellaneous Waste and Debris

Wastes generated as part of a response action will be collected and contained. Those materials that cannot be treated in the EWI-CWP complex will be characterized and disposed of offsite in accordance with state and federal laws. Such wastes may include but are not limited to the following:

- Personal protective equipment;
- Plastic sheeting used for decontamination or containment;
- Absorbent materials; and
- Contaminated soil and/or water.

II.Ea.6.g. Post-Emergency Equipment Maintenance

Post-emergency provisions are designed to prevent recurrence, to clean up and dispose of residuals, to decontaminate equipment, and to provide for personnel debriefing.

The EC will take all necessary steps to ensure that a secondary release, fire or explosion does not occur after the initial incident. Procedures that will be carried out in the affected area include:

1. Inspection for any leaks or cracks in pipes, valves, tanks, and incinerators;
2. Inspection for excess heat generation at the incident area; and
3. Isolation of residual waste materials.

All waste energetics and other cleanup residues will be tested for RCRA characteristics and other parameters as necessary to meet waste profiling requirements. The material will then be treated onsite or transported to a RCRA permitted facility should it be determined to be a hazardous waste. If the residues are determined to be non-hazardous, they will be treated onsite or disposed in a permitted solid waste landfill.

All equipment used during the cleanup will be decontaminated onsite and readied for future use. Site personnel will remove and properly dispose of contaminated clothing as necessary. Fire extinguishers will be recharged, personnel protective equipment will be replaced, and tools will be restocked. Before operations are resumed, all safety equipment will be inspected to be sure that it is fit for its intended use.

II.Ea.7. Coordination Agreements

Mutual assistance agreements have been made with the communities identified in Table 1 of Appendix II.Ea-1. Copies of the Mutual Assistance Agreements and Supplemental Agreements are maintained onsite in the facility operating record. These mutual assistance agreements pertain to the local fire departments. Furthermore, there is close cooperation between local law enforcement officials and RFAAP Security personnel for traffic control in the plant area if a significant disaster should occur.

Facility staff will contact selected local and regional entities and authorities that may be involved in responding to an emergency situation according to the anticipated needs at the plant. Personnel from these organizations may be asked to support RFAAP personnel in response to fires, explosions, or chemical releases if RFAAP personnel cannot adequately address the situation internally. Personnel from these agencies will act under the direction of the EC and will be directed and escorted by plant personnel.

Arrangements with local hospitals have also been made through agreements between RFAAP and surrounding medical facilities. Table 1 in Appendix II.Ea-1 identifies those agreements that are in place. Copies of these agreements are maintained onsite in the facility operating record. In addition, the RFAAP medical staff is familiar with the properties of the hazardous wastes handled at the facility and the types of injuries or illnesses that could result from fires, explosions or releases at the facility, and RFAAP firemen are state-certified emergency medical technicians.

Due to RFAAP’s in-house fire department, medical staff, and security force, and the unique wastes to be dealt with, the facility EC will act as the primary authority during emergency situations. RFAAP security personnel are responsible for escorting local fire department and emergency response teams to any emergency site within the plant. Emergency units from offsite will not be allowed to respond inside RFAAP without an escort. For incidents in the horseshoe area, units may be asked to assemble at Gate 10 or the main gate on Route 114. For incidents in the Main Plant Area and larger incidents in the Horseshoe Area, units may be asked to assemble at the Main Gate on Route 114. Entry to the manufacturing area will usually be through Gate 1.

II.Ea.8. Evacuation Plan

The EWI-CWP complex is located within the north central portion of the Horseshoe Area of the facility. This area is an isolated location as shown on Figure II.Ea-1. The New River acts as a protective barrier on the northern and southern exposures of this area. Thus, if an emergency situation should develop at this area, evacuation of the entire facility is not likely to be necessary. The EWI-CWP operating personnel should be the only persons immediately endangered during an emergency situation at the complex.

Evacuation procedures for the EWI-CWP complex direct personnel to assemble at the OCC (Building 610) in the event of a fire, explosion, or other event in the area and to contact the Fire Department for assistance with emergency response. Should evacuation of the area be deemed necessary, it will proceed as follows:

1. The grinder will be shut down and personnel will gather in the OCC.

2. Activities in the central accumulation area shall be stopped and secured. All personnel at the container accumulation area shall return to the control room.

3. Propellant and ECW feed to incinerators will be stopped. Operators will empty the slurry loop, flushing slurry from the line and filling it with water. If appropriate, natural gas to the unit will be stopped.

4. Transfers to and loading of the CBC will be stopped. Gases will be held in the CBC, and, if appropriate, natural gas to the unit will be stopped.

5. Transfers to and loading of the Car Bottom Oven will be stopped. If appropriate, natural gas to the unit will be stopped. If necessary, the car bottom will be vented to atmosphere.

6. Operations will be resumed when directed by supervisory personnel.

During process operations, the operators are either located in or near the OCC or are within the EWI-CWP complex. Personnel will move to and remain in the OCC, a hardened, blast-proof structure, during evacuation periods. Communication among the operators will be through existing two-way radio communication systems, telephones, or through the warning horn located within the complex. The small number of people in the area, the accessible communication systems, and the close proximity of the evacuation area help ensure a safe evacuation plan at the permitted treatment and storage area.

In addition to the local communication system at the EWI-CWP complex, the RFAAP also has a mass notification alarm system that is intended to identify persons within the facility of emergency situations as they occur. Systems are in place to warn facility personnel of the following situations:

- Active shooter situation
- Chemical release
- Fire or explosion
- Lightning warning
- Natural disaster alert

Each type of situation will be communicated through a unique alarm signal over the plant-wide "loud-voice" system. The initial alarm is then followed by a verbal warning message that is broadcast through 12-different speaker stations located throughout the plant. Upon conclusion of any of these emergency scenarios, an all-clear alarm (Westminster chimes) and verbal message will be provided via the same loud voice system.

The primary evacuation route for persons within the EWI-CWP complex is shown in Figure II.Ea-14. While the primary route for evacuation to the control room is via a direct paved path, the area surrounding the facilities is unoccupied, so alternate evacuation routes from the hazardous waste facilities to the OCC may take any number of alternative paths.

II.Ea.9. Required Reports

Pursuant to 9 VAC 20-60-264 and 40 CFR §264.56(i), the time, date, and details of any incident that requires implementation of the Contingency Plan will be noted in the facility operating record. In addition, within 15 days after the incident, a written report will be submitted to the Director of the Virginia Department of Environmental Quality. The report will include:

1. Name, address and telephone number of the owner or operator;
2. Name, address and telephone number of the facility;
3. Date, time, and type of incident;
4. Name and quantity of material(s) involved;

5. The extent of injuries, if any;

6. An assessment of actual or potential hazards to human health or the environment, where this is applicable;

7. Estimated quantity and disposition of recovered material that resulted from the incident; and

8. Such other information specifically requested by the Director that is reasonably necessary and relevant to the purpose of an operating record.

Pursuant to 9 VAC 20-60-264 and 40 CFR §264.196(d), any release to the environment from any tank system or secondary containment, except as provided below, will be reported to the Department within 24 hours of its detection. However, if the release has been reported pursuant to 40 CFR §302, that report will satisfy this requirement.

A leak or spill of hazardous waste is exempted from the reporting requirements of Section II.Ea.9 of this Contingency Plan, if it is:

a. Less than or equal to a quantity of one pound, and

b. Immediately contained and cleaned-up.

II.Ea.10. Modification of Plan

Pursuant to 9 VAC 20-60-264; 40 CFR §264.54, this Contingency Plan is subject to review and amendment, if:

a. The plan fails in an emergency;

b. The facility permit is revised;

c. The facility changes in design, construction, operation, maintenance, or other circumstances; in a way that materially increases the potential for fires, explosions, or releases of hazardous waste constituents; or changes the response necessary in any emergency;

d. The list of emergency coordinators changes; or

e. The list of emergency equipment changes.

When the contingency plan is amended for any reason the Permittee will request a permit modification pursuant to 40 CFR §270.42.

Figure II.Ea-1 – Location of the RFAAP

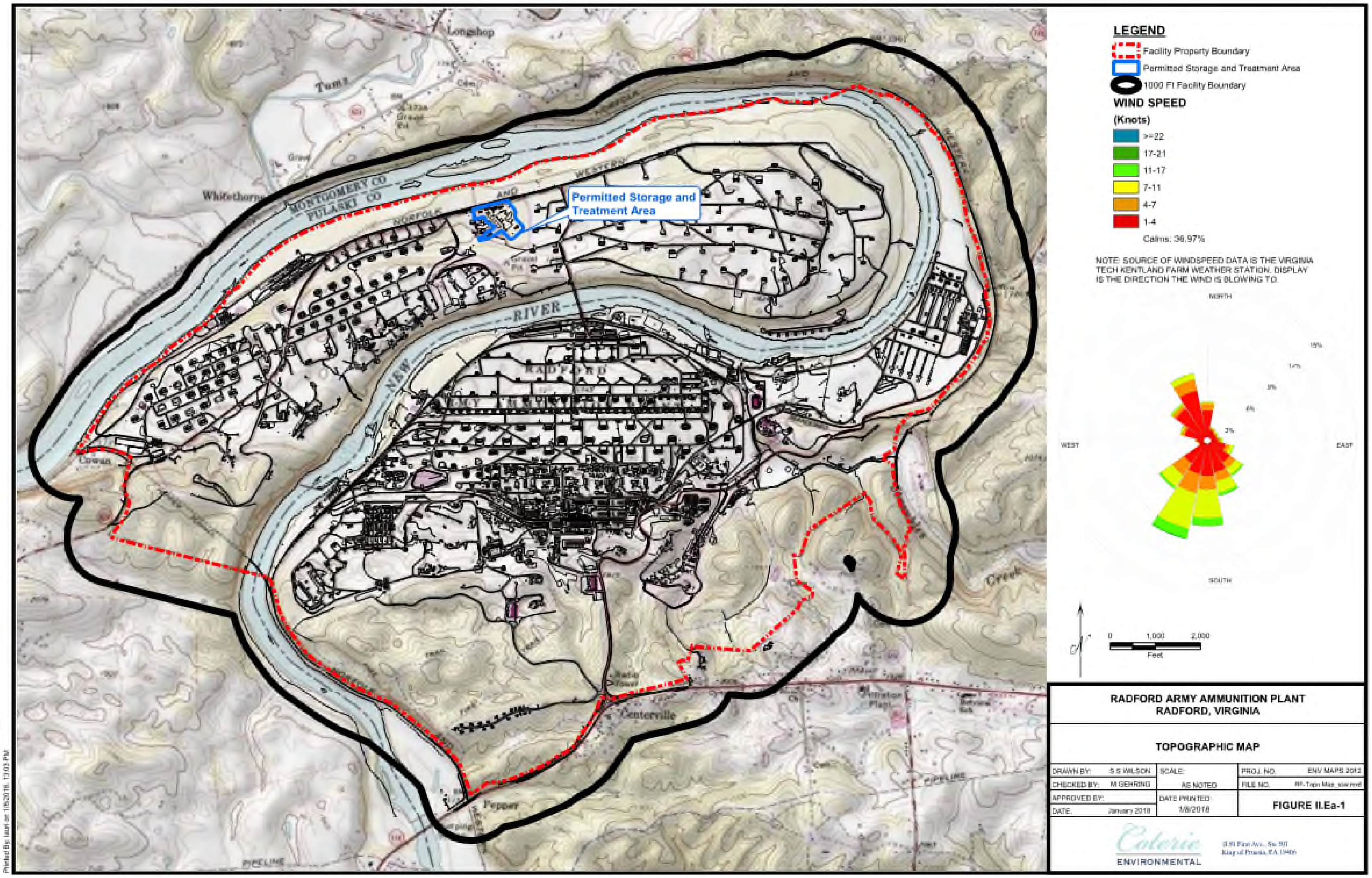


Figure II.Ea-2 – Area Map

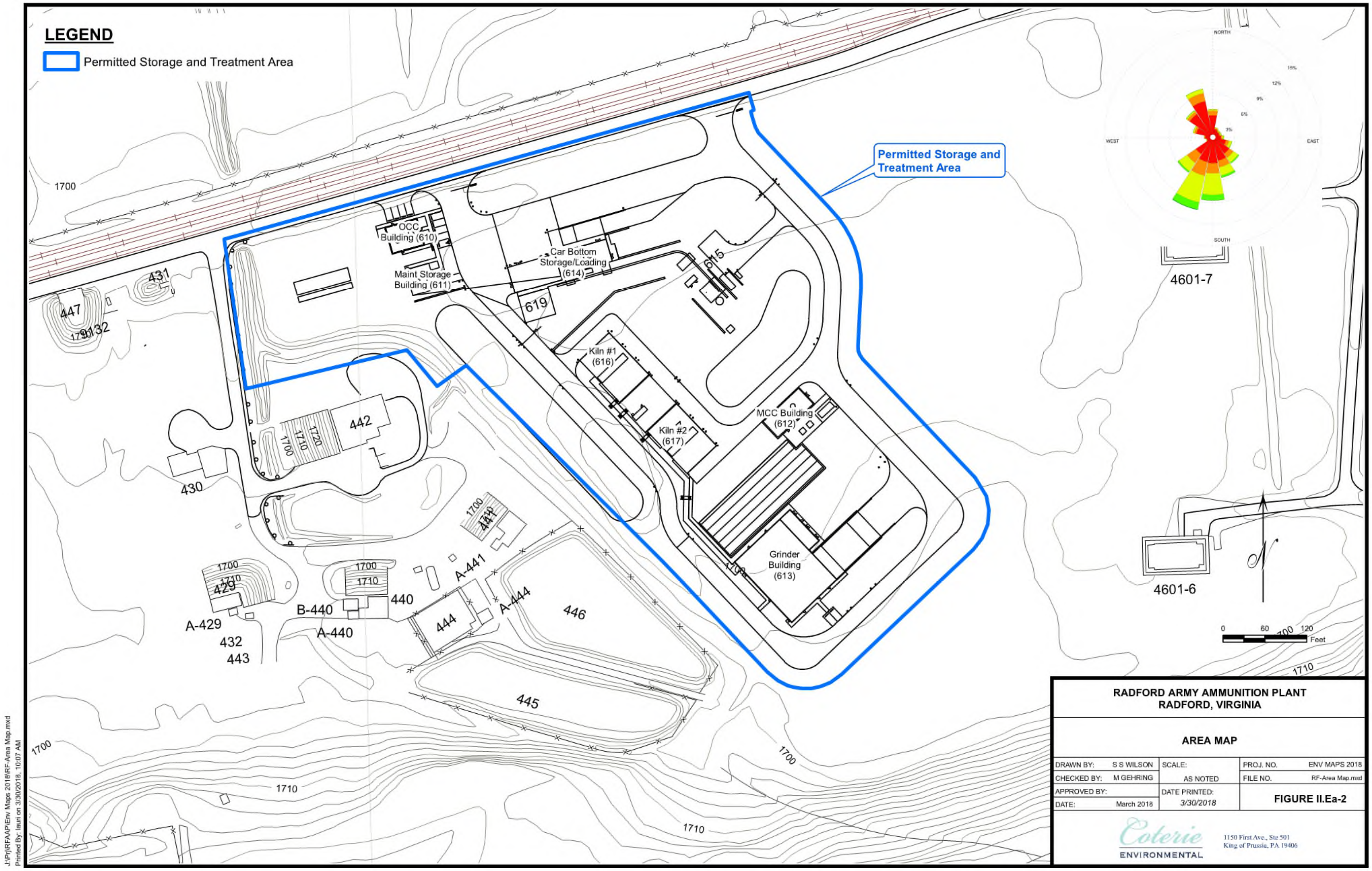


Figure II.Ea-3 - Grinder Building Process Schematic

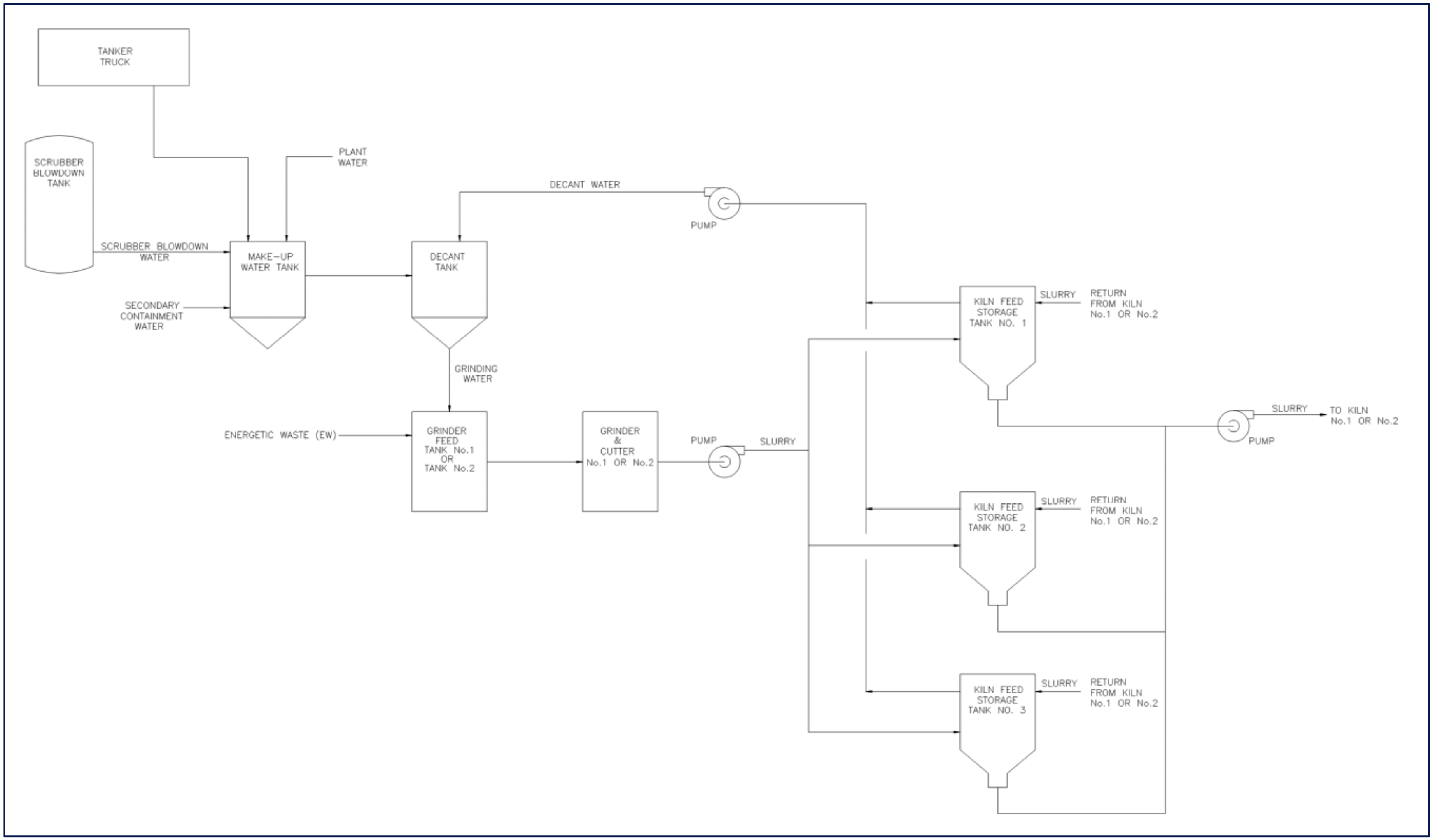


Figure II.Ea-4 - CBC and Car Bottom System Schematic

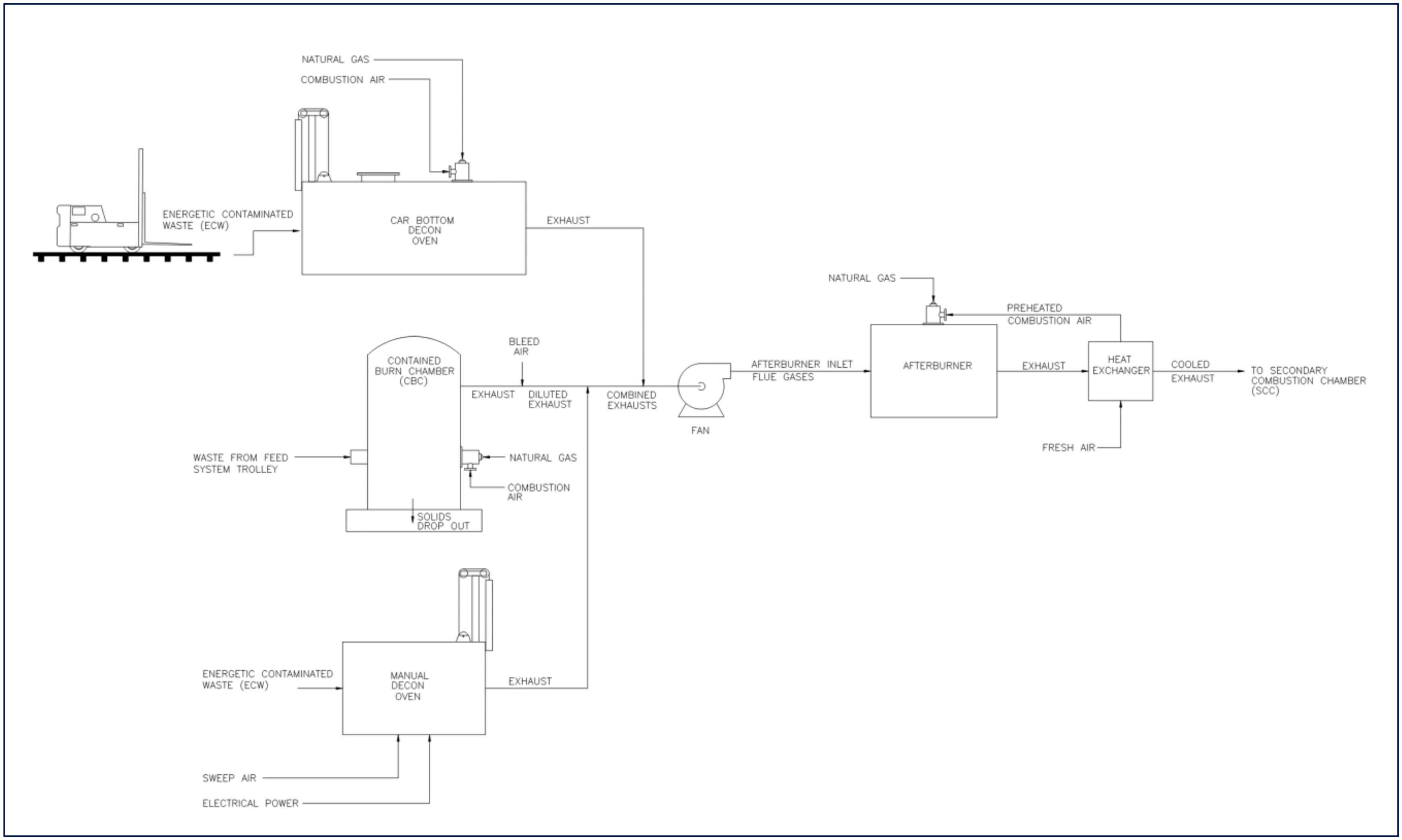


Figure II.Ea-5 - Kiln System Process Schematic (identical for each)

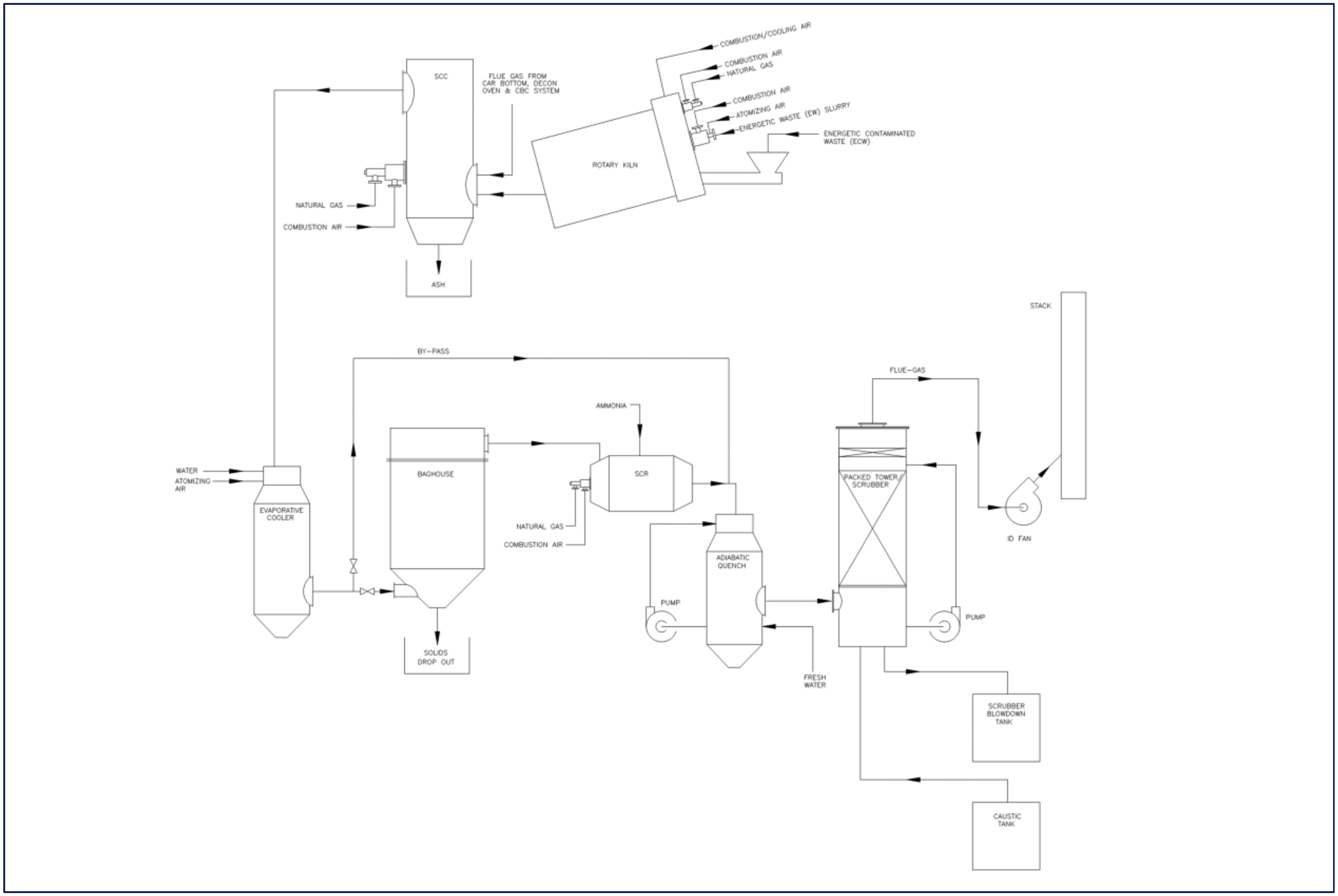


Figure II.Ea-6 - Emergency Equipment Locations (Plant Wide)

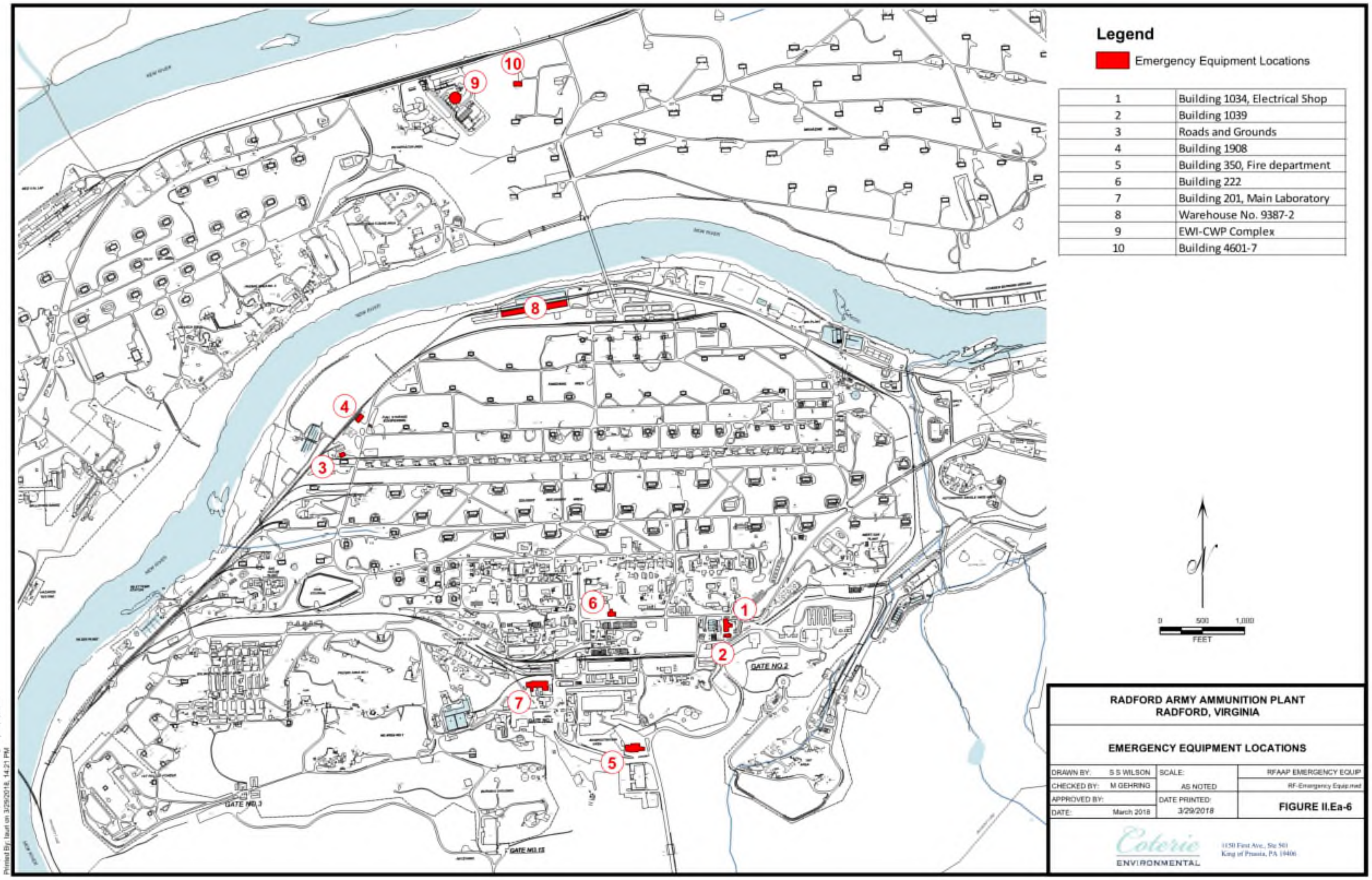


Figure II.Ea-7 - Emergency Equipment Locations (EWI-CWP Complex)

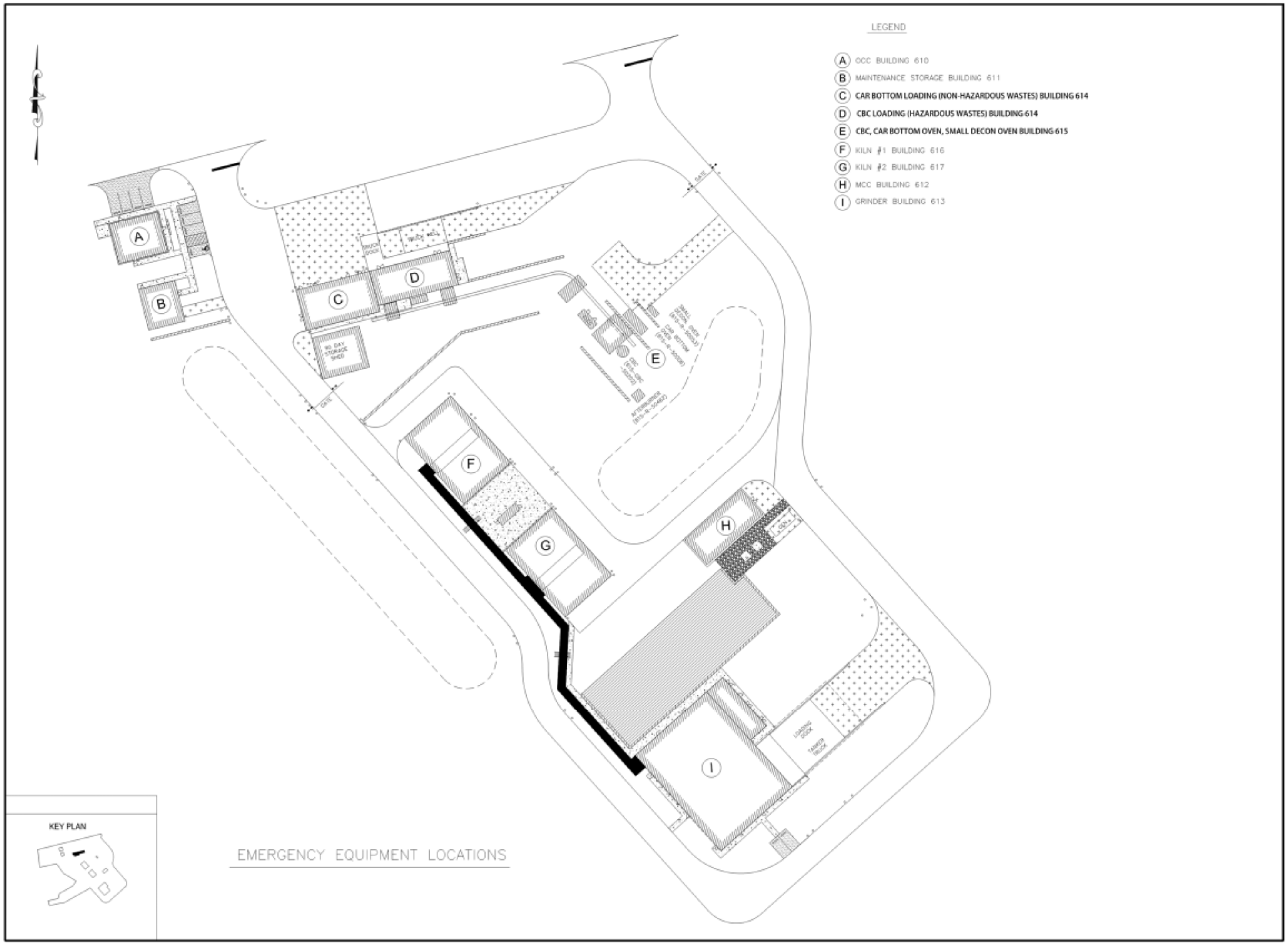


Figure II.Ea-8 - Emergency Equipment Locations (Grinder Building – DWG No. 061300-69414-F355-00)

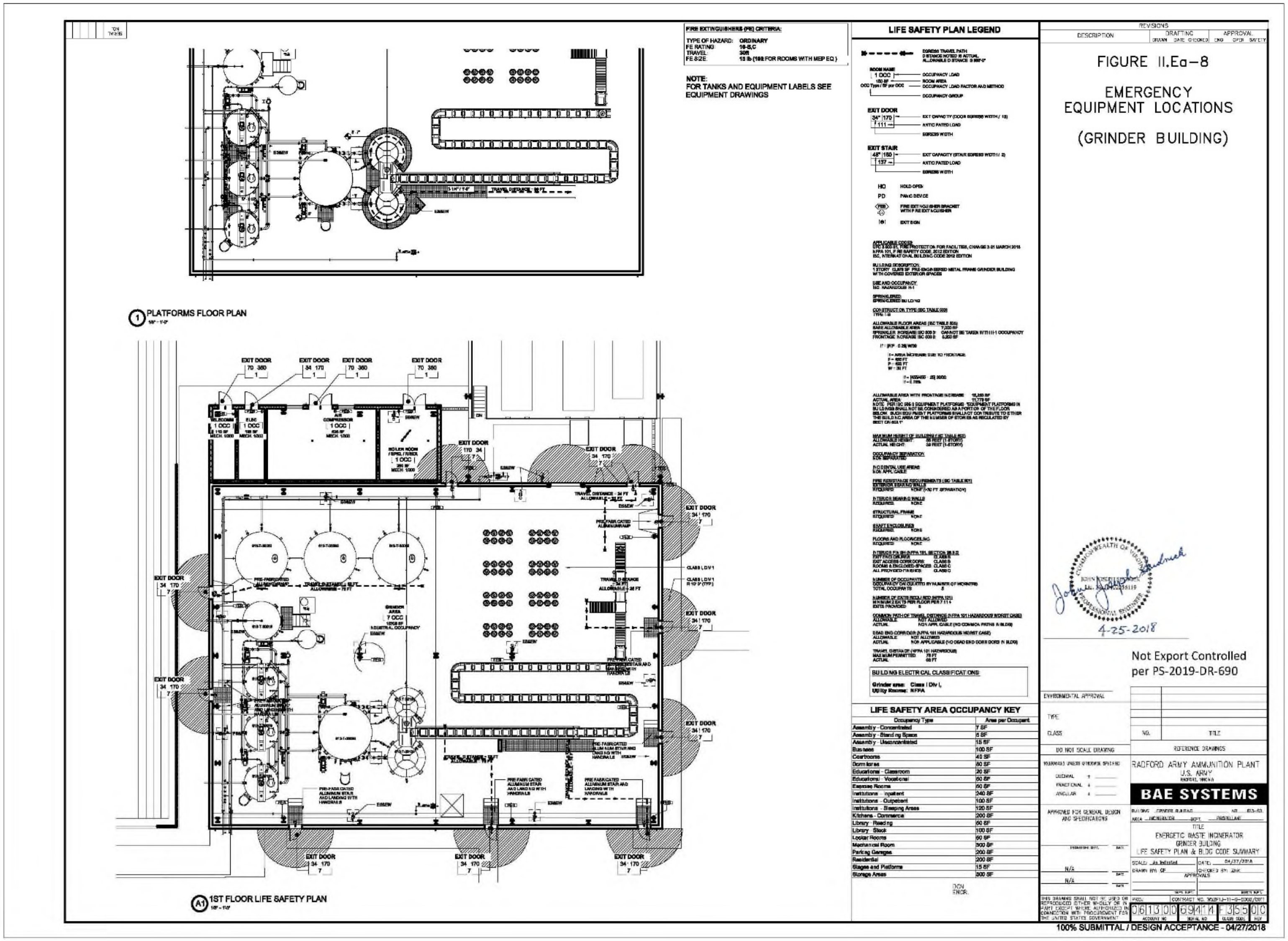


Figure II.Ea-9 - Emergency Equipment Locations (Loading Building – DWG No. 061400-69488-F355-00)

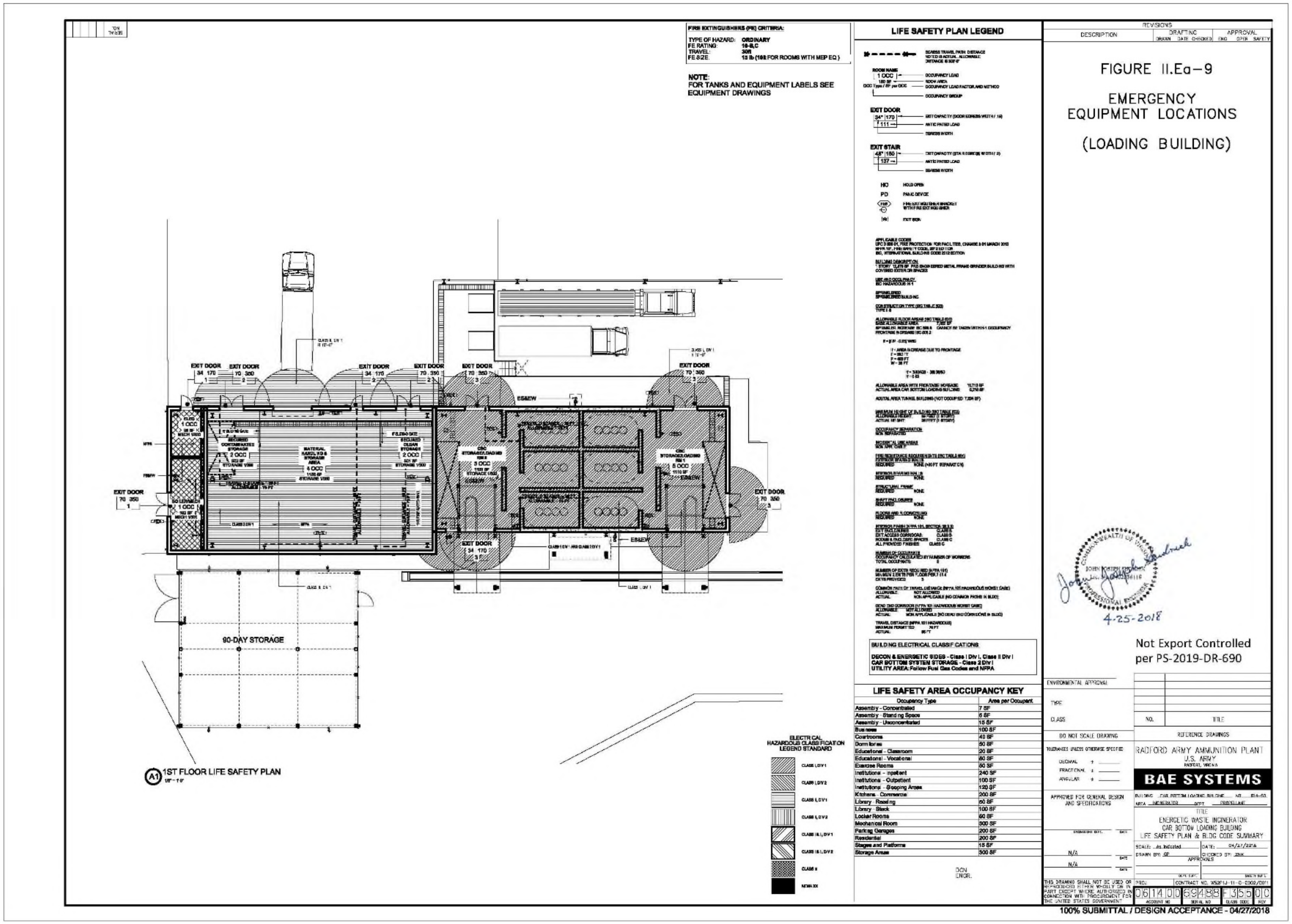


Figure II.Ea-10 - Emergency Equipment Locations (Kiln 1 – DWG No. 061600-69590-F355-00)

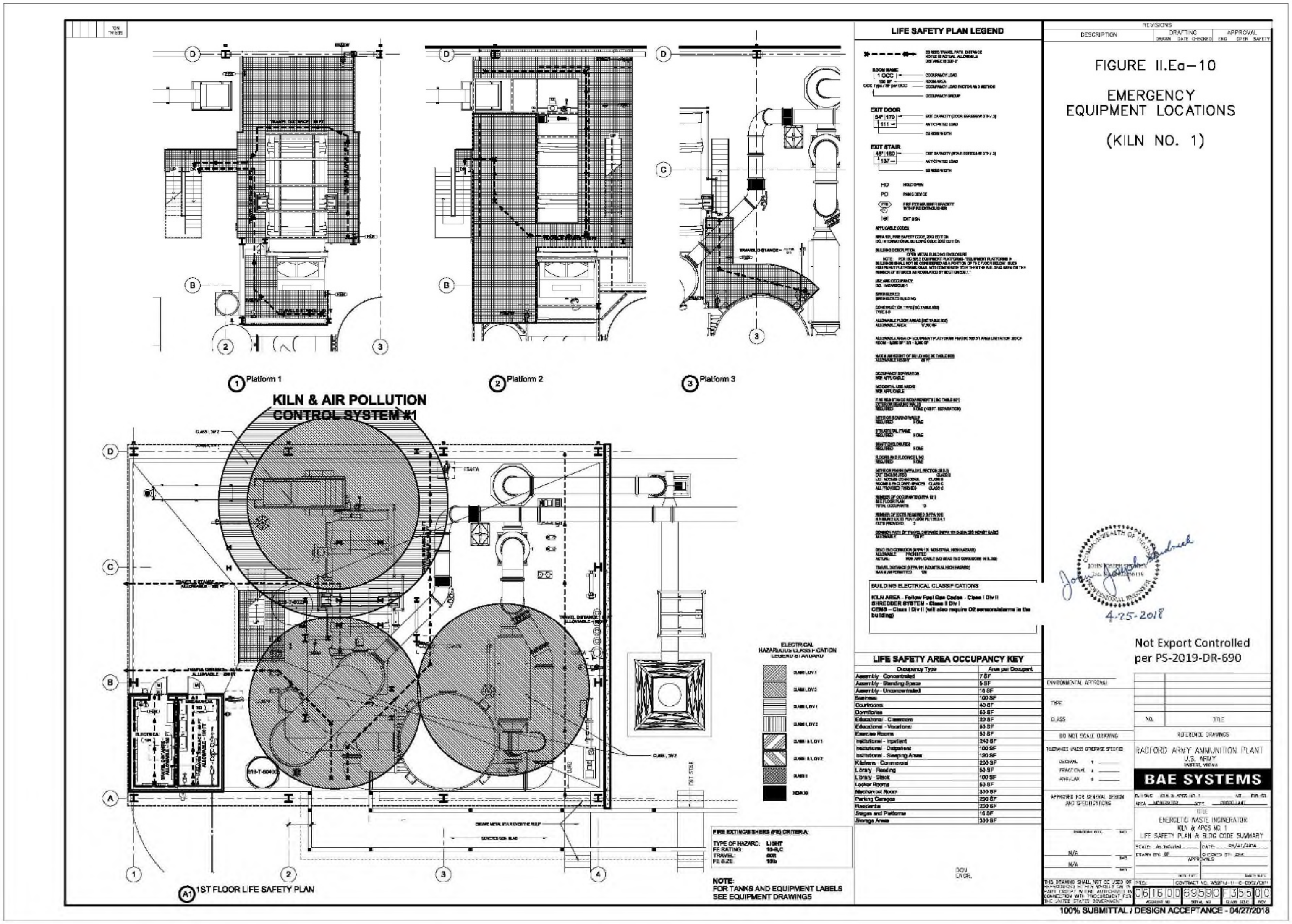


Figure II.Ea-11 – Emergency Equipment Locations (Kiln 2 – DWG No. 061700-69647-F355-00)

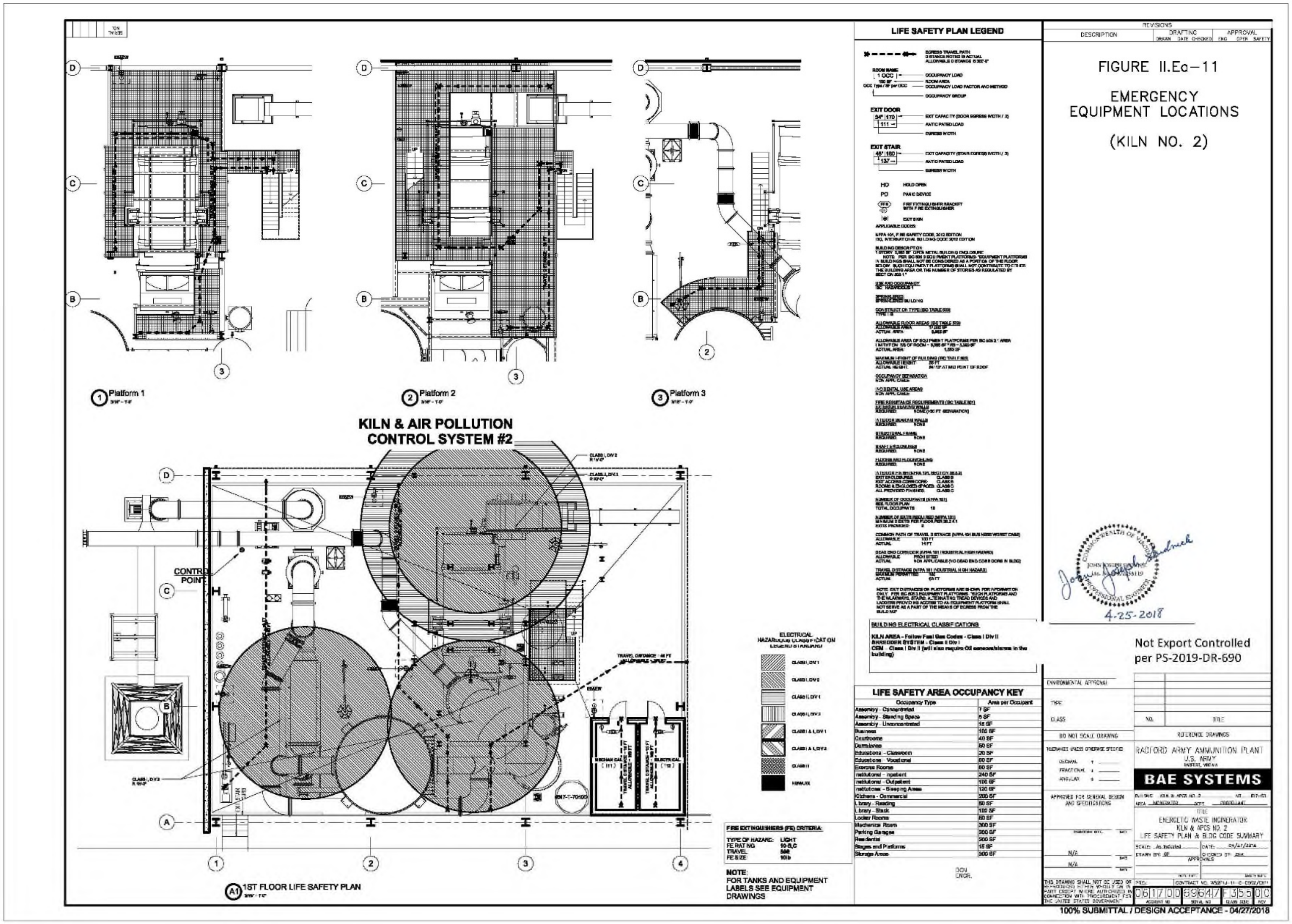


Figure II.Ea-12 - Emergency Equipment Locations (CBC Area – DWG No. 061500-69557-F355)

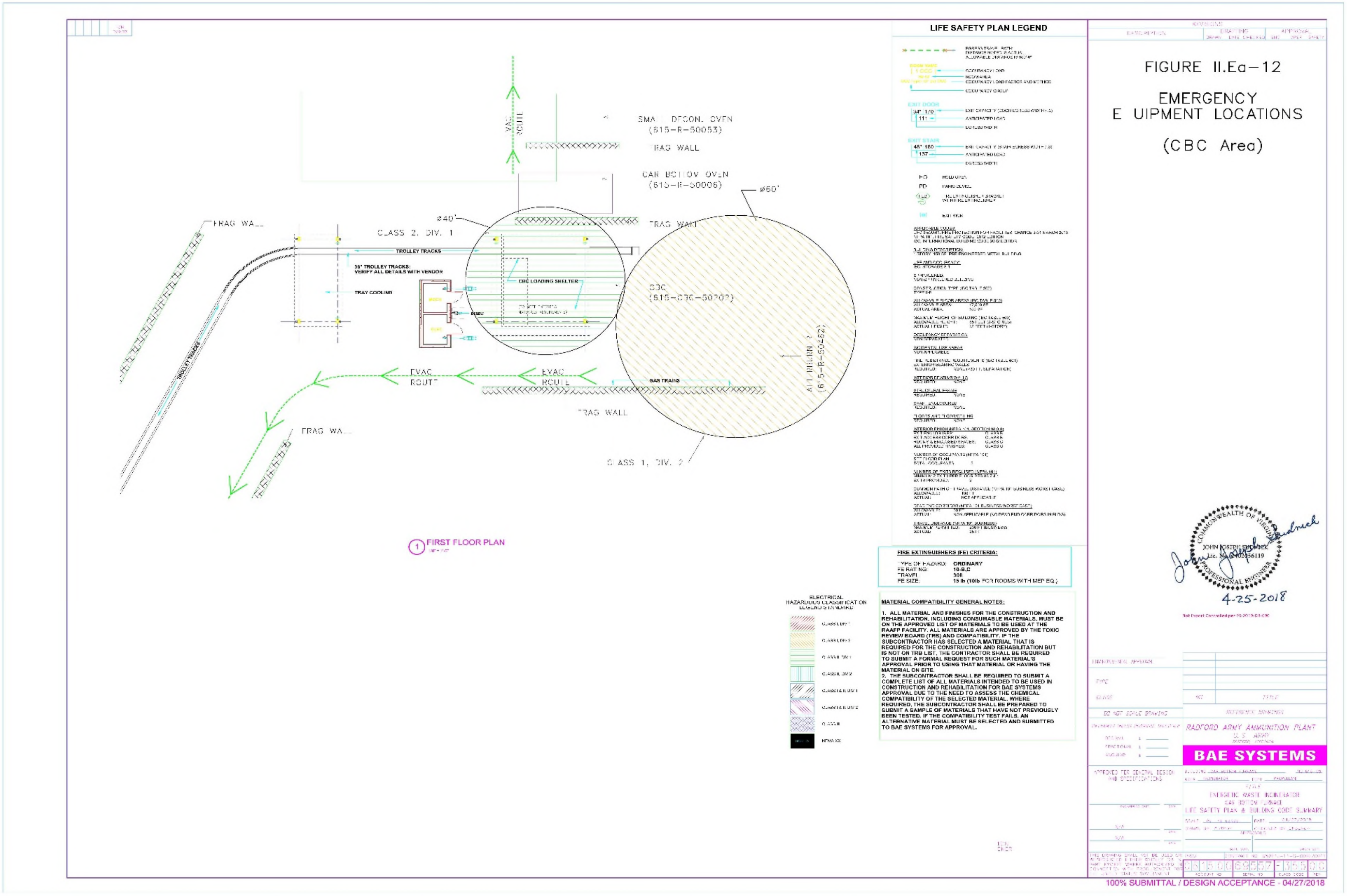
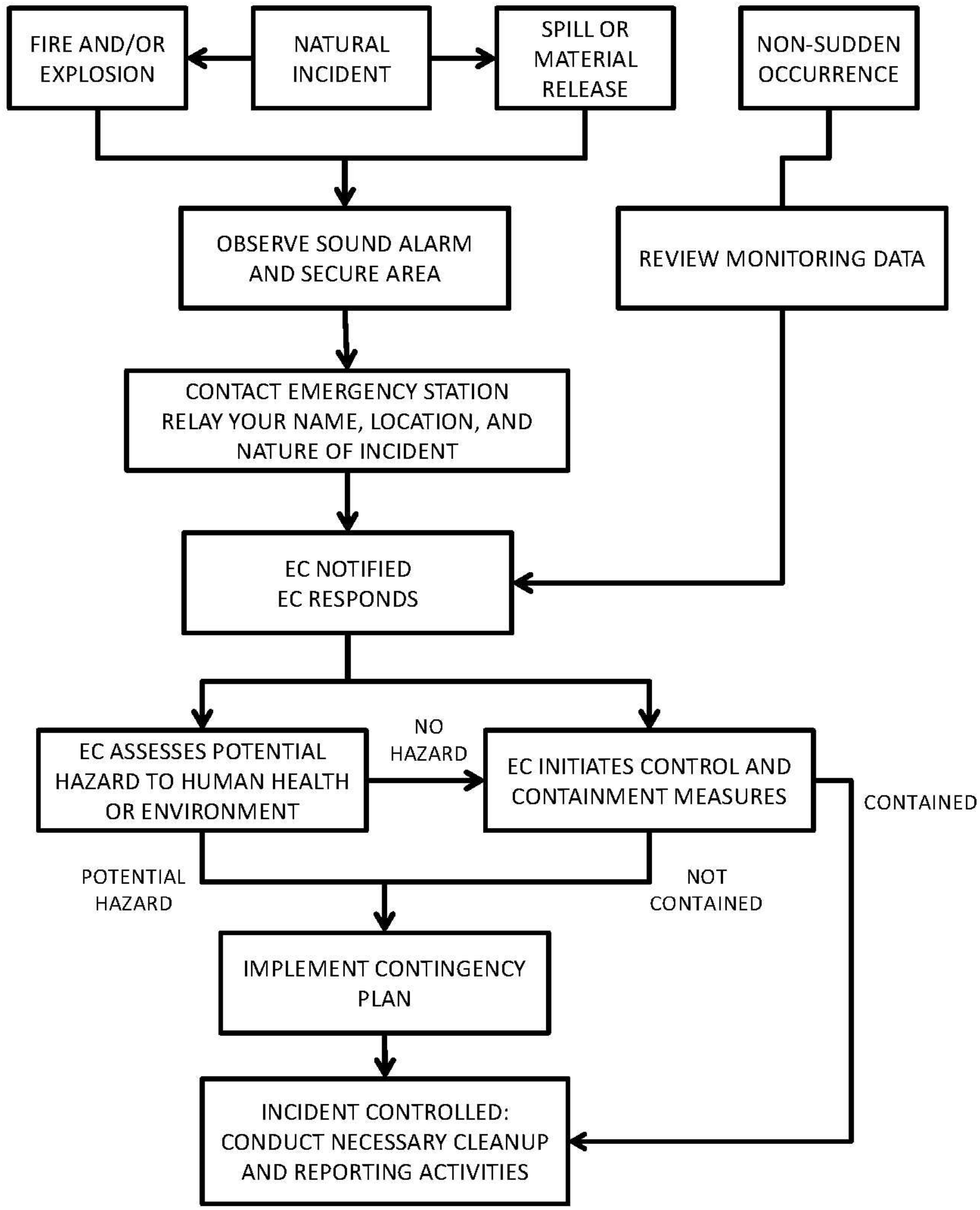


Figure II.Ea-13 - Contingency Plan Implementation Logic Diagram



EC: Emergency Coordinator

Figure II.Ea-14 – Area Evacuation Routes

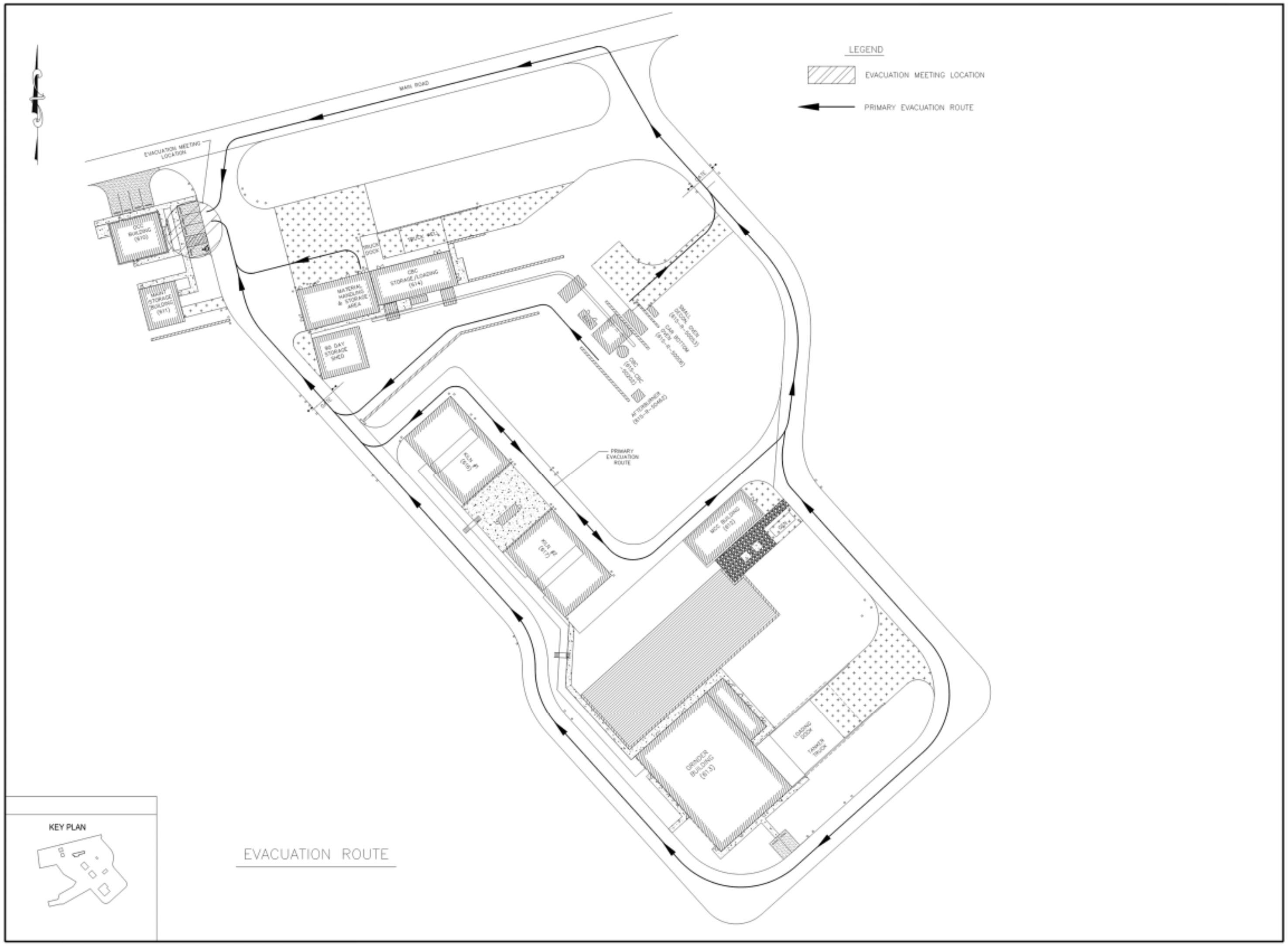


Table II.Ea-1 - Waste Groups Burned at the EWI-CWP Complex

Group No.	Description	Defining Characteristics	RCRA Waste Codes 1
1	Miscellaneous Waste	Ignitable and reactive liquids in sawdust	D001, D003
2	Miscellaneous Waste	Propellant Laboratory Waste	D001, D003, D004-D011, D030
3	Miscellaneous Waste	Waste Nitrocellulose (non-hazardous)	N/A
4	Miscellaneous Waste	Dinitrotoluene and Trinitrotoluene Wastes from manufacturing that are not listed wastes	D003, D030
5	Liquid Waste	Water Containing Triethylene Glycol (non-hazardous)	N/A
6	Liquid Waste	Water Containing Diethylene Glycol (non-hazardous)	N/A
7	Single Base Propellants	Propellant with Nitrocellulose and Lead	D001, D003, D008
8	Single Base Propellants	Propellant with Nitrocellulose	D001, D003
9	Single Base Propellants	Propellant with Nitrocellulose and Dinitrotoluene	D001, D003, D030
10	Double Base Propellants	Propellant with Nitrocellulose and Nitrate Esters	D001, D003
11	Double Base Propellants	Propellant with Nitrocellulose, Nitrate Esters and Perchlorate salts	D001, D003
12	Double Base Propellants	Propellant with Nitrocellulose, Nitrate Esters and Lead	D001, D003, D008
13	Energetics with solid explosives	Propellant with Nitrocellulose, Nitrate Esters or Solid Explosives	D001, D003
14	Triple Base Propellants	Propellant with Nitrocellulose, Nitrate Esters and Nitroguanidine	D001, D003
15	Load, Assemble, & Pack Waste	Energetic materials from manufacturing cartridges	D001, D003
16	Single Base Propellants	Propellant with Nitrocellulose, Dinitrotoluene, and/or Lead	D001, D003, D008, D030

Group No.	Description	Defining Characteristics	RCRA Waste Codes 1
17	Specialty Products Waste	Energetics with Nitrocellulose, Nitrate Esters, Nitroguanidine, Solid Explosives, or Appendix VIII[2] Constituents	D001, D003, D004-D010, D030
18	Specialty Products Waste	Energetics with Nitrocellulose, Nitrate Esters, Nitroguanidine, Solid Explosives, and Appendix VIII Constituents, Chlorides, or Perchlorates	D001, D003, D004-D010, D030
19	Specialty Products Waste	Energetics with Nitrocellulose, Nitrate Esters, Nitroguanidine, Solid Explosives, and Appendix VIII Constituents, or Metals	D001, D003, D004-D010, D030
20	Pit and Floor Wastes with FOD	Pit waste and floor sweepings from production buildings that could be contaminated with metal, rocks or other FOD.	D001, D003, D004-D011, D030
21	Scrubber Blowdown Waste	Liquid waste generated from the packed bed scrubbers' blowdown stream (non-hazardous).	N/A
22	Combustible MPPEH	Contaminated, combustible waste that potentially presents an energetic hazard (non-hazardous).	N/A
23	Listed Nitroglycerine Waste	Discarded commercial, nitroglycerine, generated from spills of commercial product, or otherwise needing to be discarded.	P081
24	Recycled Decant Water	Recycled water from the decant process associated with slurry batch formulation.	D001, D003, D004-D011, D030, P081, U002, U069, U105, U117
25	Listed Acetone Waste	Discarded commercial, acetone, generated from spills of commercial product, or otherwise needing to be discarded.	U002
26	Listed Dibutyl Phthalate Waste	Discarded commercial, dibutyl phthalate, generated from spills of commercial product, or otherwise needing to be discarded.	U069

Group No.	Description	Defining Characteristics	RCRA Waste Codes 1
27	Listed 2,4-DNT Waste	Discarded commercial, 2,4-dinitrotoluene, generated from spills of commercial product, or otherwise needing to be discarded.	U105
28	Listed Ethyl Ether Waste	Discarded commercial, ethyl ether, generated from spills of commercial product, or otherwise needing to be discarded.	U117

[1] Codes shown represent those RCRA waste codes that the waste may exhibit. Not all of the specified codes may apply to every canister of waste treated within this group.

[2] 40 CFR §261, Appendix VIII

Table II.Ea-2 - Notification Action Summary

Onsite Emergency Coordinators and Contacts			
Emergency Coordinator	**Office Phone**	**Home Phone**	**Home Address**
Plant Dispatch	(540) 639-8289 (office) (540) 639-7323/7324 (dispatch)	NA	NA
Plant Fire	(540) 639-7457 (non-emergency) (540) 639-7323 (emergency)	NA	NA
Environmental Emergency On-Call Representative **(Primary EC)**	(540) 230-8970	NA	NA
Safety On-Call Representative (**Alternate EC)**	Security will Contact	NA	NA
Environmental Manager (**Alternate EC)**	Withheld for security purposes. Security will contact. [1]		Withheld for security purposes [1]
Environmental Lead Specialist – Hazardous Waste (**Alternate EC)**	Withheld for security purposes. Security will contact. [1]		Withheld for security purposes [1]
Safety, Health & Environmental Manager (**Alternate EC)**	Withheld for security purposes. Security will contact. [1]		Withheld for security purposes [1]

Offsite Emergency Contacts [3]	
Agency	**Phone**
Army Administrative Contracting Officer, Operations Division Chief	(540) 239-4475 (cellular)
Virginia Department of Environmental Quality Blue Ridge Office	(540) 562-6700
National Response Center (for releases above a reportable quantity (RQ))	(800) 424-8802
Virginia Department of Emergency Management	(800) 468-8892
Montgomery County Local Emergency Planning Committee (LEPC)	(540) 382-2951
Pulaski County Local Emergency Planning Committee (LEPC	(540) 980-7705
Emergency Service Resources (Fire, Ambulance, Police)	911

1 In order to enhance the protection of defense services and defense articles and protect the unauthorized export of defense information under the International Traffic in Arms Regulations (ITAR), promulgated in Title 22 CFR Parts 120 through 130, the actual contact information of individual persons or contractors in the employ of RFAAP have been withheld from this Permit. This information is readily available for review and inspection at

the facility upon request. The relevant data is also readily available to plant security and supervision to respond to an emergency.

2 In addition to the notifications listed above, the EC or a designated representative should provide notification of all major emergencies to the environmental and operations management team.

[3] To be made by the Environmental Manager or a designated representative as needed.

Table II.Ea-3 - Emergency Shutdown Protections

Condition	Consequences/Actions
Loss of Induced Draft (ID) Fan	Stop all hazardous waste feeds, shut down all burner systems, open baghouse bypass line, hold gases in CBC, vent exhaust after CBC afterburner
Loss of flame to kiln burner	Stop all waste feeds to the kiln, attempt to relight burner, continue to run all other systems per normal conditions until kiln residence time and CBC cycle is complete
Loss of flame to secondary combustion chamber burner	Stop all waste feeds to the kiln, hold gases in CBC, attempt to relight secondary combustion chamber (SCC) burner
High-high temperature on evaporative cooler outlet (or complete loss of water to evaporative cooler)	Stop all waste feeds to the kiln, open baghouse bypass line, and shutdown SCR burner. If problem continues, hold gases in CBC, vent exhaust after CBC afterburner, and shut down kiln and SCC burners.
Loss of flame to SCR reheat burner	Stop all waste feeds to the kiln, hold gases in CBC, attempt to relight SCR burner
Loss of quench and scrubber water	Stop all hazardous waste feeds, shut down all burner systems, hold gases in CBC, vent exhaust after CBC afterburner

Table II.Ea-4 - Emergency Equipment Locations at RFAAP

Location # on Figures II.Ea-6 and II.Ea-7	Location Description	Equipment Available [1]
1	Bldg. 1034, Electric Shop	Rubber gloves and respirators
2	Bldg. 1039, Change House	Self-contained breathing apparatus (2)
3	Roads and Grounds Bldg	Respirators, goggles, air fed respirators, safety belts, shoe cleats, air compressors (250 and 700 cfm ratings), portable pumps (50, 100, and 700 gpm capacities), cranes, bulldozers, movers, graders, tow tractors, portable electric generators
4	Bldg. 1908, Material Storage	Absorbent materials and booms
5	Bldg. 350, Fire Department	Ladder truck, engine, utility truck, brush truck, ATV's, command vehicle, and ambulance.
6	Bldg. 222, B Line Fire Station	HAZMAT trailer with response gear, special operations trailer, and 2 boats.
7	Bldg. 201, Main Laboratory	Nitroglycerin remover
8	Warehouse No. 9387-2	Soda ash
9A	Bldg. 610, OCC	Telephone access, fire extinguishers
9B	Bldg. 611, Maintenance Storage Building	Fire extinguishers
9C/D	Bldg. 614; Car Bottom and CBC Loading	Telephone access, fire extinguishers, eye wash and safety showers, and deluge-type fire suppression system
9E	Bldg. 615; CBC, Car Bottom Oven, Small Decontamination Oven	Fire extinguisher, eye wash and safety shower, sprinkler fire suppression system
9F/G	Bldgs. 616 and 617 Rotary Kiln Incinerators	Fire Extinguishers, eye wash and safety showers
9H	Bldg. 612, MCC Building	Fire extinguishers, deluge-type fire suppression system
9I	Bldg. 613, Grinder Building	Telephone access, fire extinguishers, eye wash and safety showers, and deluge-type fire suppression system
10	Bldg 4601-7, Rest House	Telephone access and spill cleanup equipment

[1] All fire extinguishers located in the permitted treatment and storage area are multipurpose dry chemical type, charged to approximately 9 pounds of pressure.

Table II.Ea-5 - Evaluation Criteria for Implementation of the Contingency Plan

In accordance with the Contingency Plan Implementation Logic Diagram (Figure II.Ea-5), the following are examples of when the contingency plan would need to be implemented:

For a fire and/or explosion:

- If the fire causes a release of toxic fumes that go off plant or impacts personnel;
- If the fire could spread (is not contained), thereby possibly igniting materials in other locations onsite or offsite, or could cause heat induced leaks or explosions;
- If the use of fire suppressant could result in contaminated runoff that cannot be contained;
- If an explosion has or could:
  - Result in damage from flying fragments or shock waves
  - Ignite other hazardous waste at the facility
  - Release toxic materials that could cause harm to human health or the environment or cannot be contained; or,
- If a fire or explosion endangers human health or the environment for any other reason.

For spills or material releases

- If a spill endangers human health or the environment.

Table II.Ea-6 - Spill Response Measures

The spill response program will be coordinated by the Emergency Coordinator or designated representative. Guidelines are provided concerning safety, containment, evaluation, notification, treatment and monitoring as related to each spill incident.

1. Safety

    a. Evaluate the hazard of the spilled chemical to personnel that may be involved in containment, clean up, treatment and monitoring operations.

    b. Assure proper clothing and protective equipment is available and used by personnel involved in the spill response.

2. Containment

    a. Establish the expected flow path of the spilled material.

    b. Locate the nearest proposed damming site.

    c. Erect a dam –- notify Roads and Grounds regarding construction of dam.

3. Evaluation of Spill Extent

    a. Obtain pH readings at site if chemical spilled was an acid or base.

    b. Confirm stoppage of leak at source.

4. Initial Notification

    a. Delegate notification responsibility to the Emergency Coordinator.

    b. Notify appropriate agencies (see Notification Action Summary).

5. Treatment

    a. Straw or other absorbers will be supplied to entrap hazardous wastes that are spilled. Sites/locations within the plant containing straw and other entrapment materials are controlled by Roads and Grounds.

6. Monitoring Program

   Upon receiving notification of an accidental loss to the industrial sewer or surface streams, personnel will obtain grab samples at specified locations and time intervals as determined by the Emergency Coordinator.

   a. In-Plant Sites

      i. Suggested sampling sites will be determined based on the location of the spill; and

      ii. Samples will be collected at internal locations as designated.

   b. New River Site

      i. Sampling at the New River site will be performed on a staggered basis since the river flow approximates one mile per hour. Sampling will be performed by the operator at Building 4330.

7. Final Treatment

   a. Determine disposition of impounded material depending on type and quantity of spill. Ensure EPA and DEQ concur with disposition.

   b. Provide monitoring for duration of disposition.

Explosion fragments and materials as well as contaminated soils will be analyzed for explosives and nitroglycerine using either the RFAAP Technical Analytical Laboratory’s (TAL's) VELAP approved methods, or, if targeted for offsite analysis, SW846 Method 8332 for explosives and 8330 for nitroglycerine. If the analyses indicate that the materials are reactive, they will be handled as hazardous waste. Hazardous soils and residual reactive wastes will be treated in the EWI-CWP complex or sent offsite for disposal. If the analyses indicate that the materials are non-reactive, they will be decontaminated if necessary in the Small Decontamination Oven at the EWI-CWP complex and will then be disposed of in a permitted landfill or as decontaminated scrap.

Appendix II.Ea-1

Mutual Assistance Agreements

Table 1
Mutual Assistance Agreements with Local Municipalities

ENTITY	DATE OF AGREEMENT	SERVICES INCLUDED
City of Radford	July 11, 2011	Firefighting equipment and personnel
Montgomery County	October 19, 2020	Emergency and medical services personnel
Pulaski County	October 19, 2020	Emergency and medical services personnel
United States Army Research, Development, and Acquisition Information Services Activity	June 26, 1992	Force-Protection Support Responsibilities

Appendix II.Ea-2

Contingency/Emergency Plan Requirements for Hazardous Waste Management in the RFAAP Waste Accumulation Areas and the EWI-CWP Complex

Contingency/Emergency Plan Requirements for Hazardous Waste Management in the RFAAP Waste Accumulation Areas and the EWI-CWP COMPLEX

Accumulation/ Treatment Area	Type of Management[1]	Waste Properties [2]
Nitroglycerin	Central and satellite accumulation	D001, D003, U069, P081
Rocket	Central and satellite accumulation	D001, D003, D008, U002
Magazine	Central and satellite accumulation	D001, D003, D004-D010, D030
EWI-CWP Complex	Thermal treatment, tank storage, satellite accumulation, and central accumulation area	D001, D003, D004-D011, D030, P081, P115, U002, U069, U105, U117
Green Lines	Central and satellite accumulation	D001, D003, D008, D030, U069, U105, U117
Finishing	Central and satellite accumulation	D001, D003, D008, D030, U105
Fourth Rolled Powder	Central and satellite accumulation	D001, D003, D008
New River Energetics (NRE)	Central and satellite accumulation	D001, D003, D004-D010, D030
Medium Caliber Ammunition Lap	Central and satellite accumulation	D001, D003
Sample Prep	Central and satellite accumulation	D001, D003, D004-D011, D030
Main Laboratory Bldg. 201	Central and satellite accumulation	D001, D003, D004-D011, D030
Internal Ballistic Laboratory (IBL)	Central and satellite accumulation	D001, D003, D004-D010, D030

[1] Please note that the number of satellite accumulation areas in each area may change without a permit modification. A list of the exact locations of the central and satellite accumulation areas and specific type of materials managed within them is maintained onsite in the facility operating record per Condition II.I.d.x)

[2] Codes shown represent those RCRA codes that the waste **may** exhibit and that **may** be managed in the designated area. Not all of the specified codes may apply to every container of waste in the specified location and not all of the specified codes are treated at the EWI-CWP complex.

Attachment II.F – Closure Plan

II.F.1. Introduction

This Closure Plan has been prepared for the hazardous waste incinerators and associated storage/treatment tanks (herein referred to as the permitted storage and treatment area) at the Radford Army Ammunition Plant (RFAAP). This section presents the purpose of the Closure Plan, background information on the RFAAP and the incinerators, and a summary of information contained within the Closure Plan.

II.F.1.a. Purpose

This Closure Plan has been prepared for the facility as part of a Hazardous Waste Management Permit Application for the RFAAP. The purpose of the Closure Plan is to develop a closure strategy that assures the RFAAP will close the hazardous waste facilities in a manner that:

(a) Minimizes the need for further maintenance;

(b) Controls, minimizes or eliminates, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated run-off, or hazardous waste decomposition products to the ground or surface waters or to the atmosphere; and

(c) Complies with the closure requirements of 9 VAC 20-60-264, 40 CFR 264 Subpart G and 264.197 and 264.351.

II.F.1.b. Background

This section provides a brief overview of the operations at RFAAP and those operations performed at the permitted storage and treatment area.

RFAAP Operations

The RFAAP encompasses approximately 4,104 acres and is located in southwest Virginia within Pulaski and Montgomery Counties as shown in Figure II.F-1. The New River separates Pulaski and Montgomery counties and also divides the RFAAP into two portions commonly known as the Horseshoe Area and Main Manufacturing Area. These two areas and the approximate boundary of the RFAAP are shown on Figure II.F-2.

The permitted storage and treatment area is located within the north central portion of the Horseshoe Area as shown in Figure II.F-2 and is used for the incineration of waste energetics. Figure II.F-3 shows the boundary of the area and the locations of the actual structures.

RFAAP is a government-owned, contractor-operated (GOCO) industrial installation responsible to the U.S. Army. The mission of the RFAAP is to manufacture propellants, explosives, and chemical materials as assigned. As a GOCO operation, RFAAP has both Government and Contractor organizations. For the purpose of this permit application, the facility consists of all contiguous portions of the RFAAP. The facility specifically includes both the Horseshoe Area and the Main Manufacturing area. Wastes from onsite activities (including those of both the operating contractor and tenants) are stored and treated in the permitted storage and treatment area.

The facility was first constructed in 1940 and began operations producing smokeless powder (single base, double base, and triple base propellants) in 1941. Since that time various processes/products have been added to the facility including production of cast propellants, trinitrotoluene (TNT), commercial propellants, and load, assemble and pack facilities. Specific operations vary based upon contracted capacity and products from the Department of Defense and U.S. allies.

Incinerator Operations

Operations included in the permitted storage and treatment area include grinding, tank storage and treatment, and incineration equipment. The primary structures included in the permitted storage and treatment area are as follows:

- The Grinder Building (identified as Building/Account No. 442), where wastes are ground into small pieces prior to being mixed into the slurry and incinerated. The Grinder Building houses the two permitted storage tanks.

- Incinerators 440 and 441 (identified as Accounts 440 and 441), where the slurried wastes are treated in accordance with this Permit and the Hazardous Waste Combustor National Emission Standards for Hazardous Air Pollutants.

The following areas are specifically excluded from the "permitted treatment and storage area" (refer to Figure II.F-3 for structure designations) as these are included in the RCRA Corrective Action Permit issued by the DEQ or were closed under previous closure plans administered by the DEQ:

- Settling Ponds #1 and #2 (identified as Accounts 445 and 446), which were identified as Solid Waste Management Unit (SWMU) No. 39 and were previously clean-closed under the RCRA Corrective Action Permit;

- Incinerator Fuel Oil Storage Units, including Structures 432 and 443, which were underground storage tanks used for fuel oil storage and were previously closed under a plan administered by the DEQ;

- Spray Pond (identified as Account 444), which was identified as Hazardous Waste Management Unit (HWMU) No. 39 and was previously closed under a plan administered by the DEQ; and

- Ancillary Building A-444, which served as the pumphouse for the spray pond and was previously closed under a plan administered by the DEQ.

In addition to these areas, there are several other structures in the general vicinity of the incinerators that are not included in the permitted storage and treatment area because they are not used to accumulate waste for periods greater than 90 days. These buildings and structures include:

- The incinerator control room and adjacent supply area (identified as Buildings 431 and 447);

- Temporary waste accumulation area (identified as Building 430), which is used to accumulate wastes for < 90 periods prior to treatment in the incinerators; and

- Ancillary buildings in the incinerator complex that store supplies and/or instrument equipment and calibration gases (identified as Accounts A-440, B-440, and A-441).

Specific operations that are performed at the Incinerator are described below. Figure II.F-4 is a schematic diagram that shows how the wastes are processed as part of the treatment process.

1. Waste materials are transported from production areas in < 20 gallon containers to a < 90 day accumulation area at Building 430 or Building 4601-7. (Note: the wastes are accumulated for less than 90 days and therefore these buildings are not permitted container storage facilities).

2. At the Grind House (Building 442) the energetic waste is loaded onto a trolley, dumped into a hopper, and fed onto a conveyor. The material is sprayed with water to minimize the chance of a waste explosion. Oversize and metallic materials are removed from the waste stream on the conveyor and dropped into the grinder feed hopper. Again the waste is sprayed with water to minimize the potential for an explosion. The waste is then ground and added to one of two slurry tanks. In the slurry tanks the waste is mixed with water to form a slurry for incineration. These slurry tanks are not completely emptied

every 90 days; therefore, these tanks have been permitted as > 90 day storage tanks.

3. The waste slurry is circulated through a piping system to the incinerators' feed pump house and back to the slurry tank to prevent settling and buildup of solids in the lines. Portions of this flow are directed from the feed pump house to the incinerators for treatment.

4. Residue from the incineration system is collected in ash buggies and drums and is accumulated. The ash is staged onsite pending sample analysis and is then disposed in a properly permitted disposal facility.

II.F.2. Hazardous Waste Characteristics Analysis

This section provides a general discussion of the types and sources of hazardous wastes that are stored and treated at the Incinerator. This information includes the general types of wastes managed, specific waste streams, and maximum hazardous waste inventory.

II.F.2.a. General Waste Types

The hazardous wastes that are managed (treated and stored) at the permitted facility include waste energetic materials and spill "cleanup" residues generated at the facility. These wastes are hazardous due to their ignitability (D001) and/or reactivity (D003). Additionally, some of the wastes may exhibit the toxicity characteristic for certain metals and/or 2,4-dinitrotoluene. A detailed description of the wastes is provided in the Waste Analysis Plan in Attachment II.A of this Permit.

II.F.2.b. Waste Composition

The composition of the wastes fed to the incinerators varies over time due to changes in the production schedule at the RFAAP. Generally, these wastes include miscellaneous energetic wastes. For purposes of classification under RCRA, these wastes have been segregated into waste groups that differ based on their primary components and RCRA waste codes. There are no wastes stored or treated in the permitted storage and treatment area that are incompatible with one another.

II.F.2.c. Maximum Hazardous Waste Inventory

At any given point in time, the hazardous wastes present in the permitted storage and treatment area are as follows:

- Waste slurry contained in the two slurry tanks;

- Accumulated waste awaiting processing in the grinder building; and

- Potentially hazardous ash from the incineration system accumulated in collection chambers at the incinerators.

The actual maximum quantity of reactive material (waste energetics) allowed in the Grinder Building at any time is 5,000 pounds per building explosive design criteria. This actual maximum quantity includes any waste energetic material in the two slurry tanks, as well as any waste energetic material in the Grinder Building that is waiting to be placed into the slurry tanks. However, the actual inventory of waste energetic material in the building prior to closure should be significantly less, as the slurry lines and tanks would be burned out and flushed with water prior to initiating closure.

II.F.3. Review of Potential Impacts

This section contains a review of potential impacts to soil and groundwater in the permitted treatment and storage facilities as a result of hazardous waste management activities. These potential impacts will be evaluated and appropriately addressed as part of the closure activities.

II.F.3.a. Geological Considerations

In assessing the potential impacts to the surrounding area, it is important to consider the physiographic, geologic, hydro-geologic, and hydrologic conditions in and around the permitted hazardous waste storage and treatment area.

RFAAP is part of the Appalachian Highlands in the portion characterized as the valley and ridge physiographic province. Elongated, narrow, ridges consisting of relatively resistant sandstones characterize this area and dolomites strike southwest to northeast with narrow valleys of varying length and width between these ridges. This topography is the result of a complex sequence of thrust faulting and folding over the past 100 million years. Sedimentary rocks consisting of limestone, dolomite, and minor sandstone underlie the area. These rocks are complexly folded, faulted, and fractured. RFAAP is constructed above the Elbrook Formation, which is of the Cambrian Era and consists of dolomite, shale, and minor limestone. Typical features of this formation are sinkholes, solution channels, and a pinnacled bedrock surface. Surface coverage consists primarily of residual silts and clays derived from the underlying rock. Alluvial deposits are also present along the banks of the New River and adjoining flood plain. These alluvial soils consist of Micaceous silts and sandy clays underlain by coarser deposits of silty and clayey sands and gravel. Cobbles and boulders are scattered within the alluvial deposits.

The incinerator itself sits on the flat terraced land adjacent to the New River. The underlying soils in this portion of the plant consist primarily of a 5 to 10-foot layer of silty clays, clayey silts, and clayey/silty sands. Between 10 to 20 feet below ground surface, the soils become coarser, grading to silty sands and silty/sandy gravels. Bedrock consisting of limestone and some dolostone is present at a depth of approximately 20 feet below ground surface. Solution channels and some voids have been identified in the limestone bedrock.

Groundwater in the vicinity of the RFAAP occurs at relatively shallow depths in both soil and bedrock and is typically recharged by precipitation and stream flows. Groundwater in the terrace formations typically is found near the soil-bedrock interface. In flood plain areas, groundwater is typically present within the alluvial material. In the limestone and dolomite formations, groundwater is typically found in fractures and solution channels. At the incinerator, groundwater has been found at a depth of approximately 20 feet below ground surface. The water table is present at the soil/bedrock interface or in the upper portion of the bedrock.

The New River flows through the RFAAP and separates the main area of the plant from the Horseshoe area, where the incinerators are located. In addition, the river serves as the dividing line between Pulaski and Montgomery counties. Surface water flows, including those in the incinerator area, generally drain to the New River with the exception of portions of the southeastern area of the plant. Surface water in this area flows to Stroubles creek, which then empties into the New River.

II.F.3.b. Impacts to Soil

In accordance with the EPA Corrective Action Permit, a Plant-wide Background Study was completed in September 2000. The soil samples collected during the Plant-wide Background Study were analyzed for all of the hazardous constituents listed in Appendix VIII of 40 CFR Part 261. The report on these analyses was submitted to and approved by the DEQ in May 2002. Data from this sampling event or another existing and more recent event will be used in the evaluation of soils during closure.

II.F.3.c. Impacts to Groundwater

Groundwater in the vicinity of the incinerators was evaluated for potential impacts as part of the RCRA Facility Investigation (RFI)/Corrective Measures Study (CMS) of solid waste management unit (SWMU 39) near the incinerators. The results of this study were submitted to the DEQ in August 2005. This data or other existing data from a more recent groundwater investigation will be used in the evaluation of groundwater during facility closure.

II.F.4. General Closure Analysis

This section presents the general goals and criteria for developing a closure strategy and developing criteria for closure. Feasible options for closure of the facilities are reviewed and evaluated with regard to regulatory requirements and environmental protection, economic feasibility, and practicality.

II.F.4.a. General Closure Criteria

As stated in the introduction, the purpose of the Closure Plan is to develop a closure strategy that assures the RFAAP will close the hazardous waste facilities in a manner that:

a. Minimizes the need for further maintenance;

b. Controls, minimizes or eliminates, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated run-off, or hazardous waste decomposition products to the ground or surface waters or to the atmosphere; and

c. Complies with the closure requirements of 9 VAC 20-60-264; 40 CFR 264 Subpart G, and §§ 264.197 and 264.351.

In accordance with the VHWMR and the RCRA, 40 CFR Part 264, Subpart G, RFAAP will close the hazardous waste management units (HWMU) in compliance with 40 CFR 264.111, Closure Performance Standards. RFAAP intends to remove all hazardous waste and all hazardous waste constituents at the Incinerators and tanks at the time of closure to levels at or below the standards established herein (clean closure). This clean closure will be accomplished via one of two methods:

- Comparison to background levels - RFAAP will compare the levels of constituents remaining in the hazardous waste management unit, equipment, structures, soils and/or sub-soils are below detection or, when statistically evaluated, are below representative background levels.

- Risk Assessment - The facility may demonstrate that the concentrations of hazardous constituents detected and remaining in the hazardous waste management unit, equipment, structures, soils and/or sub-soils do not pose an unacceptable level of risk to human health and the environment.

If a risk assessment is performed to determine compliance with the closure standards, the risk assessment criteria shall comply with one or more of the following DEQ guidance documents or other DEQ risk-based guidance, as applicable:

- Virginia Unified Risk Assessment Model (VURAM) guidance, and Risk Based Methodology, as amended by the DEQ. Modeling shall also include fate transport modeling with SESOIL as a preferred model.

- DEQ Guidelines for Developing Health-based Cleanup Goals Using Risk-based Assessment at a Hazardous Waste Site Facility for Restricted Industrial Use, June 1995.

- DEQ's Draft Guidance Manual for Closure Plans and Post Closure Plans for Hazardous Waste Management Facilities, dated September 28, 2001.

Any and all risk-based standards used in certifying a risk-based closure will be established in concert with DEQ. As part of this process, RFAAP will submit a risk assessment protocol for review and approval by DEQ and will also revise this closure plan as appropriate. If closure to residential standards/use is not possible, then the option to pursue restricted-use closure (*e.g.*, commercial or industrial use) may also be exercised.

II.F.4.b. Closure Alternatives

Various alternatives are available for closure of the Incinerators and tanks. The various components of the facilities that will need to be addressed as part of the closure process include the physical structures included as part of the Incinerators and tanks as well as the soil and groundwater underlying these facilities.

Closure Alternatives for Structures

Once hazardous waste treatment and/or storage operations cease it will be necessary to partially or completely close the facilities as appropriate. Two basic options are available for closure of these facilities.

First a hazardous waste contractor can dismantle the equipment subject to closure. The dismantled equipment can then be shipped offsite for treatment/disposal. A hazardous waste determination will need to be performed for each waste stream followed by the necessary waste characterization.

The second closure option would require that all waste handling equipment be decontaminated. Once decontaminated the equipment can then be dismantled and disposed of as non-hazardous solid waste or recycled as scrap material. This option will require greater onsite management of decontamination fluids, wash water, decontamination verification, and overall management. However, overall costs should be significantly lower as the only hazardous waste generated that would require offsite treatment or disposal would likely be the decontamination/wash water as opposed to significant quantities of contaminated debris as generated in the first option.

Based upon the economic advantages and potential for reduced quantities of hazardous wastes, RFAAP will decontaminate equipment to be closed prior to dismantling.

Closure Alternatives for Soil and Groundwater

Once the closed structures have been decontaminated it will be necessary to address any potential impacts to soil and groundwater. The first step in this process will be to implement a sampling protocol to determine the following:

- If soils under the Incinerator and tank structure(s) have been contaminated; and

- If any impacts that did occur have migrated through the soil to the uppermost aquifer.

Once the extent of any impacts is determined, a closure approach for the soils and groundwater will be developed. Three basic closure options are available depending on the impacts encountered:

- Option 1: If no impact to groundwater is encountered, pursue clean closure or risk-based closure for any contaminated soil.

- Option 2: If limited impact to groundwater is encountered, remove source material or “hot spots” and perform limited follow-on monitoring as appropriate.

- Option 3: If significant groundwater impact is discovered, remove source material and/or provide some means of groundwater control.

At this time there are various options for excavating soil for offsite treatment/disposal as well as various onsite and in-situ treatment methods that may be applicable depending upon the exact nature of impacts to soil. For the purpose of this Closure Plan it is assumed that any potential soil impacts will be limited in nature and that soil excavation will be a feasible and cost effective closure option.

It should be noted that actual closure of the facilities is not anticipated for some time. As such, innovative treatment alternatives may become available that may be more favorable to excavation and offsite treatment/disposal. Based upon the actual extent of any impacts and technological advances, RFAAP may choose to modify this Closure Plan based upon findings when each facility is closed.

II.F.4.c. Partial and Final Closure

Final closure of the units is not anticipated in the near future, nor is partial closure anticipated for any portions of the Incinerator. At such time that closure is expected, this Closure Plan will be reviewed an updated as necessary to reflect any changes to the closure philosophy or expected procedures. Additionally, should any portions of the facilities be closed prior to final closure, those portions will be closed in accordance with all applicable closure procedures in this Closure Plan or an appropriate updated version of it.

II.F.5. Detailed Closure Process

This section presents a detailed description of the closure process that is anticipated for the permitted storage and treatment area, considering the closure alternative selected in Section II.F.4. This process will include the following steps:

1. Inventory Removal
2. Site Preparation
3. Closure Construction
4. Soil Treatment
5. Sampling and Analysis
6. Cover System Evaluation
7. Interim Actions

Figure II.F-5 provides a flow chart outlining the closure approach that is planned.

II.F.5.a. Inventory Removal

The initial step in the closure process will be treatment and removal of the remaining hazardous waste.

After receipt of the final quantity of hazardous waste at the facility (or specific portion thereof identified for partial closure), all hazardous waste inventory will be removed by processing through the grinder, slurry tanks, and incinerators in the usual manner. Any hazardous waste or waste slurry remaining in Tanks 1A or 1B, the make-up tank, or the catch tank that cannot be incinerated, as well as any slurry or rinsate resulting from the slurry loop line backflush after completion of incineration of the final hazardous waste batch, will be removed for treatment or disposal as hazardous waste. Tanks will be emptied of any remaining waste or waste slurry in accordance with the general steps listed below.

1. Any remaining waste slurry will be collected in containers for disposal as hazardous waste.

2. The make-up tank will be inspected for propellant fines and cleaned as necessary. The contents of the tank will be transferred to the slurry tanks.

3. Propellant fines will be drained from the slurry tanks and collected for disposal. Propellant fines are typically collected by draining the liquid that remains in the tank through a muslin bag.

4. The slurry tanks will then be flushed with water, again collecting any propellant fines.

5. The slurry tank operations will then be shut down.

After all of the tanks are emptied, the secondary containment structures and the floors and sumps in the Grinder Building and at the incinerators will be visually inspected for any spilled waste. Any waste on the floors will be cleaned up. All sumps will be cleaned by removing waste with non-sparking tools.

Any waste slurry collected from the tanks either initially or after the subsequent cleaning operations will be screened to remove the excess water or mixed with sawdust to absorb all free liquids. This material, along with any solid propellant fines collected during the emptying and cleaning operations, will be manifested to a RCRA permitted offsite treatment or disposal facility that is capable of handling the material in accordance with all state and federal laws or will be treated onsite at the facility's open burning ground. At the time that a decision is made as to the final disposition of these waste materials (*i.e.*, onsite versus offsite treatment), any steps necessary to further prepare and package the wastes for treatment and/or shipment to an offsite facility will be identified and implemented. These procedures will be submitted to DEQ as a Class 1 modification for approval before closure is initiated. Any shipping of hazardous wastes will be done in accordance with all applicable RCRA and DOT requirements.

Any residual liquids emptied from the tanks will be processed in the facility’s wastewater treatment system, if permissible under the facility’s VPDES Permit. RFAAP will analyze the liquid to determine if the material is compatible with operations at the biological wastewater treatment plant (WWTP). If treatment is feasible, RFAAP will request a modification to the facility VPDES permit to allow such treatment, if necessary. If such treatment is not feasible, the material will be transferred to drums or other acceptable containers and will be characterized as required for offsite disposal. If the material is determined to be hazardous, the material will then be manifested to a RCRA permitted offsite treatment or disposal facility that is capable of handling the waste in accordance with all state and federal laws. If non-hazardous, the material will be transported to an appropriate offsite treatment or disposal facility in accordance with all state and federal laws.

II.F.5.b. Site Preparation

Once the remaining hazardous waste inventory is treated, a series of preparatory activities will be performed prior to the start of actual facility closure. These activities will include the following:

1. Delineation of exclusion zones around the various work areas as needed for the safety of workers involved with the closure operations and those of RFAAP staff in surrounding areas. Specific items will be addressed as part of RFAAP safety policies and health and safety plans developed by any subcontractors involved in the closure operations.

2. Establishment of decontamination areas for personnel and equipment involved in the closure operations.

3. Establishment of staging areas for uncontaminated demolition debris, contaminated scrap/debris, contained liquids, and other waste streams including containers for any contaminated material. No waste or contaminated material shall be placed on the ground without a liner.

4. Establishment of temporary facilities required for closure activities (e.g., storage trailers, field office, *etc*.)

5. Visual inspection of all secondary containment and/or building floor/sump surfaces for cracks or gaps. All such cracks or gaps will be sealed with an epoxy sealant to assure that wash solution will not migrate into or through the material.

6. Other permitting that may be required (*e.g*., modification of VPDES permit for treatment of wastes generated as part of the closure activities, VPDES storm water permit for construction activities, *etc*.).

II.F.5.c. Decontamination and Closure of Incinerators

This section presents the processes that will be used to initiate closure of the Incinerators. This includes a discussion of the burn-out process and a description of how the waste materials will be contained.

Burn-Out Process

After incineration of the final quantity of hazardous waste, the incinerators will be operated at or above minimum operating temperature for a period of not less than eight hours. During this period only natural gas fuel will be burned and only clean water will be fed to the incinerator through the slurry feed system. It is the intent of this burn-out process to destroy any residual waste explosives that may remain within the incinerator units.

After the burnout period, the incinerator and air pollution control system will be visually inspected for the presence of any accumulated solid residues. If detected, such residue will be removed as noted below.

Burn-Out Process Waste Management

Waste generated and/or accumulated at the end of the burn-out process will be collected, analyzed as specified herein, and properly disposed. The types of wastes that are expected to be encountered include the following:

- Incinerator ash (consisting of the ash and incinerated solids that accumulate at the kiln breeching, the evaporative cooler, the fabric filter, the pre-cooler, and the scrubber);

- Scrubber water and any scrubber sludge; and

- Fabric filter bags and scrubber packing material (after burn-out process is complete).

These wastes will be managed as described below.

1. All incinerator ash residue will be analyzed as required for offsite disposal and sent to an appropriately permitted facility. If determined to be hazardous waste via analysis or treated as such through an abundance of caution, the ash will be sent to a properly permitted RCRA facility.

2. Scrubber water will be processed in the RFAAP's wastewater treatment system and discharged in accordance with VPDES permit regulations if the waste is compatible with treatment processes (the VPDES permit will be modified to allow such discharge as needed). Scrubber water that cannot be processed in the RFAAP wastewater treatment system will be analyzed as required for offsite disposal and sent to an appropriately permitted facility.

3. Scrubber sludge will be analyzed as required for offsite disposal and sent to an appropriately permitted facility. If determined to be hazardous waste via analysis or treated as such through an abundance of caution, the sludge will be sent to a properly permitted RCRA facility.

4. The fabric filter bags and the scrubber packing material will be analyzed as required for offsite disposal and sent to an appropriately permitted facility. If determined to be hazardous waste via analysis or treated as such through an abundance of caution, the bags will be sent to a properly permitted RCRA facility.

Decontamination Verification

Samples will be collected from the incinerator equipment to verify that the decontamination process has been successful before it is dismantled. Wipe samples will be taken from throughout the incinerator and air pollution control system from the following locations:

- Oversize propellant hopper
- Metal containing propellant hopper
- Trolley conveyor and associated piping
- Refractory of the rotary kiln
- Refractory of the afterburner
- Gas ducts
- Ash hoppers
- Internal surfaces of the evaporative cooler
- Internal surfaces of the fabric filter
- Internal surfaces of the pre-cooler
- Internal surfaces of the scrubber
- Exhaust stack

A minimum of five wipe samples will be taken from various locations in each of the items specified above. A minimum of five background samples will also be taken. Background samples will be taken from exterior building surfaces in the vicinity of the incinerator. The location of background sampling locations will be approved by the DEQ prior to sampling.

Samples will be collected by applying a detergent solution to a piece of 11-centimeter (cm) diameter filter paper (*e.g.,* Whatman 40 ashless, Whatman "50" smear tabs, or equivalent) or gauze pad. The moistened filter paper or gauze pad will be used to thoroughly swab a 100 cm^2 area. A template may be used to assist in the collection of a 100 cm^2 sample. When a template is used, it will be thoroughly cleaned between samples to prevent cross contamination of subsequent samples of the template or disposable templates will be used for each independent sampling location.

The wipe samples collected as part of this process will be analyzed for reactivity as well as for all of the hazardous constituents listed in Table II.F-1. The constituents presented in this table represent those hazardous constituents presented in Appendix VIII of 40 CFR Part 261 that are present or are expected to be present in the wastes burned in the incinerator. This list was determined through a combination of process knowledge, analytical data, and Safety Data Sheets.

The samples will be analyzed for reactivity by the appropriate test method specified in the Waste Analysis Plan. The samples will be analyzed for the presence of hazardous constituents by appropriate methods from SW-846, latest edition. The method with the lowest acceptable detection limit for each constituent of interest will be used. All applicable sample handling and preservation procedures of SW-846 Chapter Three will be observed. At least one blank, which will consist of a moistened filter paper or gauze pad, will be taken daily when sampling is ongoing.

Lack of contamination will be adequately demonstrated if the concentration of a constituent in a wipe sample is equivalent to or less than the concentration of the average background concentration. Those areas from which wipe samples exhibit a concentration of greater than the average background concentration will require further decontamination.

Further decontamination will consist of a high-pressure spray wash similar to that described for the Grinder Building and associated equipment below or will involve scrubbing with a detergent solution. After further decontamination, the subject areas will again be sampled with wipes, analyzed as before, and compared to background. This process will be repeated until all sampled areas are adequately decontaminated. Wash water will be handled in the same manner as the decontamination wastes described later in this section.

Decontamination of the Grinder Building, Tanks, and Associated Equipment

All tanks and equipment that may have contacted hazardous waste will be decontaminated prior to dismantling. These tanks and equipment include, but are not limited to, the following:

- Slurry tanks (Tanks 1A and 1B);
- Make-up tank;
- Catch tank;
- Feed hopper;
- Conveying mechanisms;
- Metal detector;
- Oversize detector;
- Pumps;
- Grinder;
- Tank agitators; and
- Slurry piping lines.

The general requirements of these procedures and related waste management practices are included in the following sections.

Equipment Decontamination Procedures

All potentially contaminated tanks and equipment will be cleaned and decontaminated prior to dismantling. Decontamination procedures will be performed in accordance with various RFAAP operating procedures and will include the steps noted below:

1. Equipment will be cleaned using properly grounded and inspected pressure washers or steam sprayers until contamination is visibly removed or adequately softened for subsequent scraping and cleaning.

2. Remaining material will be removed by scraping, dipping parts in caustic solutions, *etc*

3. Equipment bays and/or adjacent areas will be washed down.

4. Any catch basins or floor sumps will be cleaned out.

All wash water will be collected. If deemed compatible, these wash waters will be sent to the onsite WWTP for processing. If incompatible with the materials processed at the WWTP, the collected wash water will be characterized as required to facilitate offsite disposal. All analyses will be performed using the appropriate methods from SW-846, latest edition, or onsite procedures, if appropriate. The method with the lowest acceptable detection limit for each constituent of interest will be used.

The wash downs and analysis of the wash water will continue until the decontamination process is complete. Complete decontamination will be demonstrated by the achievement of the numerical limits of concentration in wash water for all hazardous constituents specified in Table II.F-1. Alternatively, complete decontamination may be demonstrated through the use of a statistical comparison of clean, pre-rinse, water with the post-rinse wash water.

If a statistical comparison is used, at least three samples of wash water from each area and three samples of clean water will be analyzed for all constituents in Table II.F-1. Complete decontamination will be demonstrated by no significant difference between clean water and wash water for all constituents. The statistical procedure used will be the Student’s t-Test with one-tailed t values at the 0.05 level of significance.

After the tanks and associated equipment are removed from the facility the following process will be used to wash down and decontaminate all floors, sumps, and containment structures in the Grinder Building.

1. Any spilled liquids and solids will be removed for disposal.

2. All surfaces will be visually inspected for the presence of additional cracks or gaps discovered upon removal of decontaminated equipment. All such cracks or gaps will be sealed with an epoxy sealant in order to assure that wash solution will not migrate into or through the material.

3. All surfaces will be washed at least three times with a high pressure, low volume water spray. The specifications for the pressure cleaner will be a minimum achievable pressure of 2000 psi and a flowrate of less than 10 gpm. A minimum of 0.25 gallons per square foot of surface will be used for the pressure wash. Wash water will be collected after each rinse and will be collected separately from each area undergoing cleaning.

Again, all wash water will be collected and after the third washing, the water from each area will be evaluated to determine if it is compatible with the WWTP and treated therein if appropriate. If it is not possible to treat these waters onsite, they will be characterized as required to facilitate offsite disposal.

The wash downs and analysis of the wash water will continue until decontamination is complete. As before, complete decontamination will be demonstrated by the achievement of the limits of concentration in wash water for all hazardous constituents specified in Table II.F-1. Alternatively, complete decontamination may be demonstrated through the use of a statistical comparison of clean, pre-rinse, water with the post-rinse wash water.

Management of Decontamination Wastes

Waste generated and/or accumulated as part of the equipment decontamination process will be collected, analyzed as specified herein, and properly disposed. A description of each type of waste generated from the decontamination process and anticipated management practices are presented below.

Decontaminated tanks and equipment will either be sold, used at a different location at the facility, or shipped offsite as scrap. Residues removed from equipment during decontamination at the facility will be collected and analyzed as required to facilitate offsite disposal. If this material is found to be non-hazardous, it will be disposed of onsite or offsite as solid waste. If this material is found to be hazardous, it will be disposed of offsite in accordance with all state and federal laws.

After each washing, the wash water will be collected. If the wash water is compatible with the RFAAP wastewater treatment system, it will be processed in said system. Again, such wastewaters will be analyzed to assure that they are compatible with the wastewater treatment system processes. If onsite treatment is not feasible, the water will be contained, characterized as required for offsite disposal, and transported offsite (as a hazardous or non-hazardous waste based upon the analyses) in accordance with state and federal regulations.

II.F.5.d. Evaluation of Surface and Subsurface Impact

As stated previously, all secondary containment and/or building floor/sump surfaces within the Grinder Building, slurry loop line, and incinerators will be surveyed for visible signs of a material release or potential release routes (*i.e.*, cracks, gaps, etc.). During site preparation, all such cracks or gaps will be sealed with an epoxy sealant in order to assure that decontamination wash solution will not migrate into or through the material.

Any cracks or gaps sealed with epoxy prior to decontamination shall be investigated at the time of demolition using coring techniques in order to determine whether they fully penetrate the concrete to the soil. Where such cracks are observed to be fully penetrating, a sampling and analysis program will be undertaken to determine the extent of impact. A comprehensive soil sampling and analysis plan will be prepared at the time of closure if necessary and submitted to the DEQ for approval. It is anticipated that the program would progress as follows:

1. Collect soil samples from the cored locations. Survey these locations prior to demolition of the structure.

2. Following demolition and removal of the concrete, relocate the original sample locations using the survey information. These original locations will be the starting points for sampling grids to delineate the horizontal and vertical extent of any impacts.

3. Analyze the soil samples for all of the hazardous constituents listed in Table II.F-1 using the analytical methods specified in the latest version of SW-846 at the time of closure.

If there is no apparent release or potential for release observed, a simplified sampling program will be implemented to confirm that a release has not occurred.

II.F.5.e. Management and Disposal of Miscellaneous Materials

The cleanup operations will likely result in the generation of other miscellaneous materials that may be contaminated during the cleanup process. Such materials may include but may not be limited to the following:

- Brushes, brooms, mops, buckets and related cleaning supplies;
- Shovels, absorbents, and other tools; and
- Plastic sheeting.

All such waste materials will be characterized as required to facilitate offsite disposal. Based upon these characterizations, the wastes will be disposed at a properly permitted facility in accordance with state and local laws. Liquid wastes may be discharged to the RFAAP wastewater treatment facility in accordance with the facility VPDES permit if such wastes are compatible with the treatment processes.

II.F.5.f. Site Restoration

Once the waste materials and decontaminated equipment have been removed from the site, the area of the Incinerator will be restored. In the event that demolished foundation structures and/or other materials must be excavated for disposal offsite, site restoration will include backfill and compaction of any excavations, grading, and revegetation of the affected area(s). All backfill material must be analyzed before use at the site to ensure that it is “clean fill.” The backfill material will be analyzed for the constituents specified in Table II.F-1 by appropriate methods from SW-846, latest edition. Additional constituents may be added to the analyses at the time of closure, pending DEQ approval. In the event that it becomes necessary to conduct excavations at the time of closure, a detailed plan of the proposed excavation and site restoration activities will be submitted to the DEQ for approval.

II.F.5.g. Certification of Closure

Within 60 days of completion of the closure process, the Permittee shall submit, by registered mail, a certification that the Incinerators and tanks have been closed in accordance with the specifications of this Closure Plan. The certification shall be signed by an independent, Virginia registered professional engineer. The certification shall also be signed by the Installation Commander or a principal corporate officer or duly authorized representative(s) of the contracted operator pursuant to 9 VAC 20-60-264 and 40 CFR Part 264.115.

II.F.6. Post-Closure Care and Groundwater monitoring

As previously discussed, it is the intent of RFAAP to close the Incinerators and tanks such that there is unrestricted future land use of the area. As such, no specific provisions for site monitoring, land restrictions, etc. have been included in this Closure Plan. Should site conditions change that would necessitate a change in the closure approach, such post closure care and monitoring may be warranted. If necessary, details of such activities will be developed in a future amendment to the Closure Plan. Section II.F.8 of this Closure Plan addresses the general permit modification process that would be necessary to amend the Closure Plan in accordance with 40 CFR 264.112(c).

II.F.7. Closure Cost and Schedule

Federal facilities are exempt from the closure financial requirements pursuant to 9 VAC 20-60-264 and 40 CFR 264.140(c).

The Department shall be notified at least 45 days before final closure of the Incinerators and/or tanks is expected to begin. The date upon which closure is expected to begin will be the date upon which the final volume of hazardous waste is received at the Incinerator. Table II.F-2 shows the proposed schedule from notification of the department through submittal of the closure certification. As shown in the table, all closure activities are to be completed within 180 days after receiving the final volume of hazardous waste. Certification of closure shall be made within 60 days after the completion of closure activities. This time frame allows for the required sample analyses, additional decontamination and/or soil removal (as needed), and resampling.

In the event that the RFAAP is unable to complete closure of the incinerators and/or tanks within the timeframe established above and outlined in 40 CFR 264.113, RFAAP shall request an extension to the closure period. In making this request, RFAAP shall provide a demonstration that the required closure activities will take longer than 180 days to complete and RFAAP has and will continue to take all steps necessary to prevent threats to human health and the environment from the unclosed but not operating hazardous waste management unit, including compliance with all applicable permit requirements. Pursuant to 40 CFR § 264.113(c)(2), the request for an extension of the closure period shall be made at least 30 days prior to expiration of the 180-day period allotted for closure.

If the facility's permit is terminated, or if the facility is otherwise ordered, by judicial decree or Order of the Board, to cease receiving hazardous waste, the Incinerators and tanks shall be closed in accordance with the deadlines established in 9 VAC 20-60-264 and 40 CFR 264.113.

II.F.8. Modification to Closure Plan

The Permittee shall submit a written request for a permit modification to authorize a change in the approved Closure Plan whenever:

- Changes in operating plans or facility design affect the Closure Plan;
- There is a change in the expected year of closure, if applicable; or
- In conducting partial or final closure activities, unexpected events require a modification of the approved Closure Plan.

The Permittee will submit a written request for a permit modification including a copy of the amended Closure Plan for approval as follows:

- At least 60 days prior to the proposed change in facility design or operation; or
- No later than 60 days after an unexpected event has occurred that has affected the Closure Plan.

If an unexpected event occurs during the partial or final closure period, the Permittee shall request a permit modification no later than 30 days after the unexpected event. The Department will approve, disapprove or modify this amended plan in accordance with the procedures in 40 CFR Parts 124 and 270. In accordance with 40 CFR 270.32, the approved Closure Plan will become a condition of this Permit.

Figure II.F-1 – Location Map

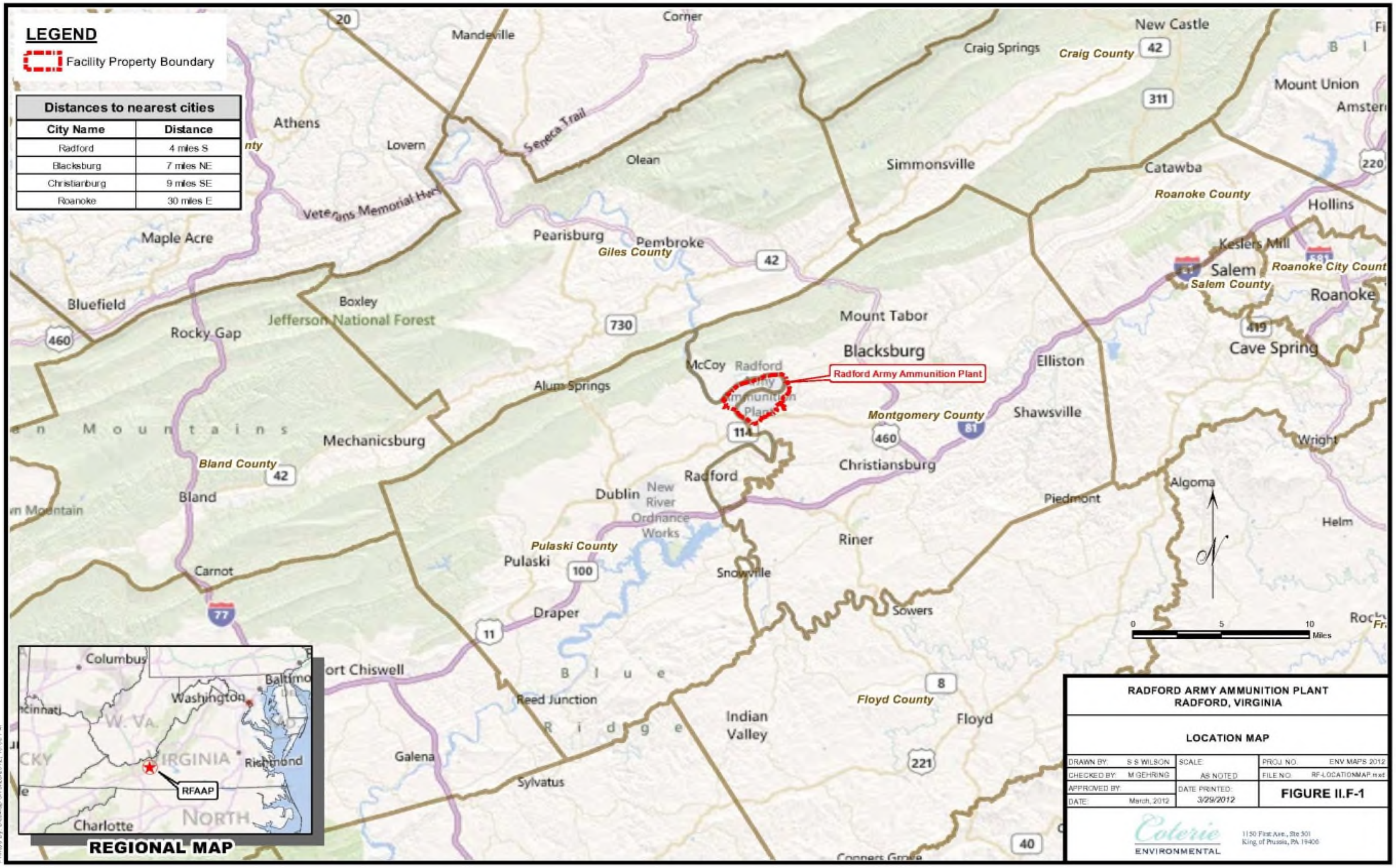


Figure II.F-2 – Plot Plan

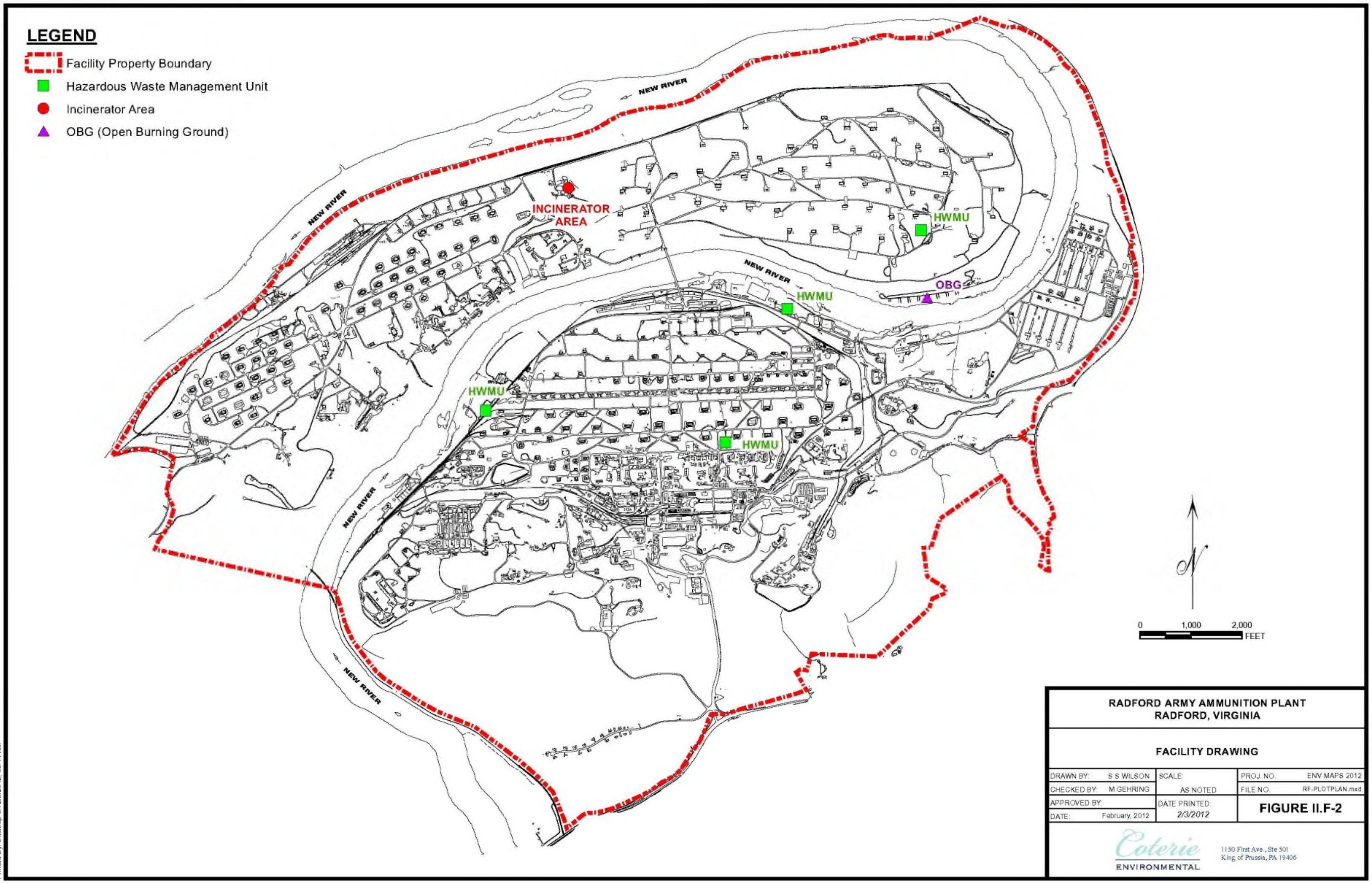


Figure II.F-3 – Area Map

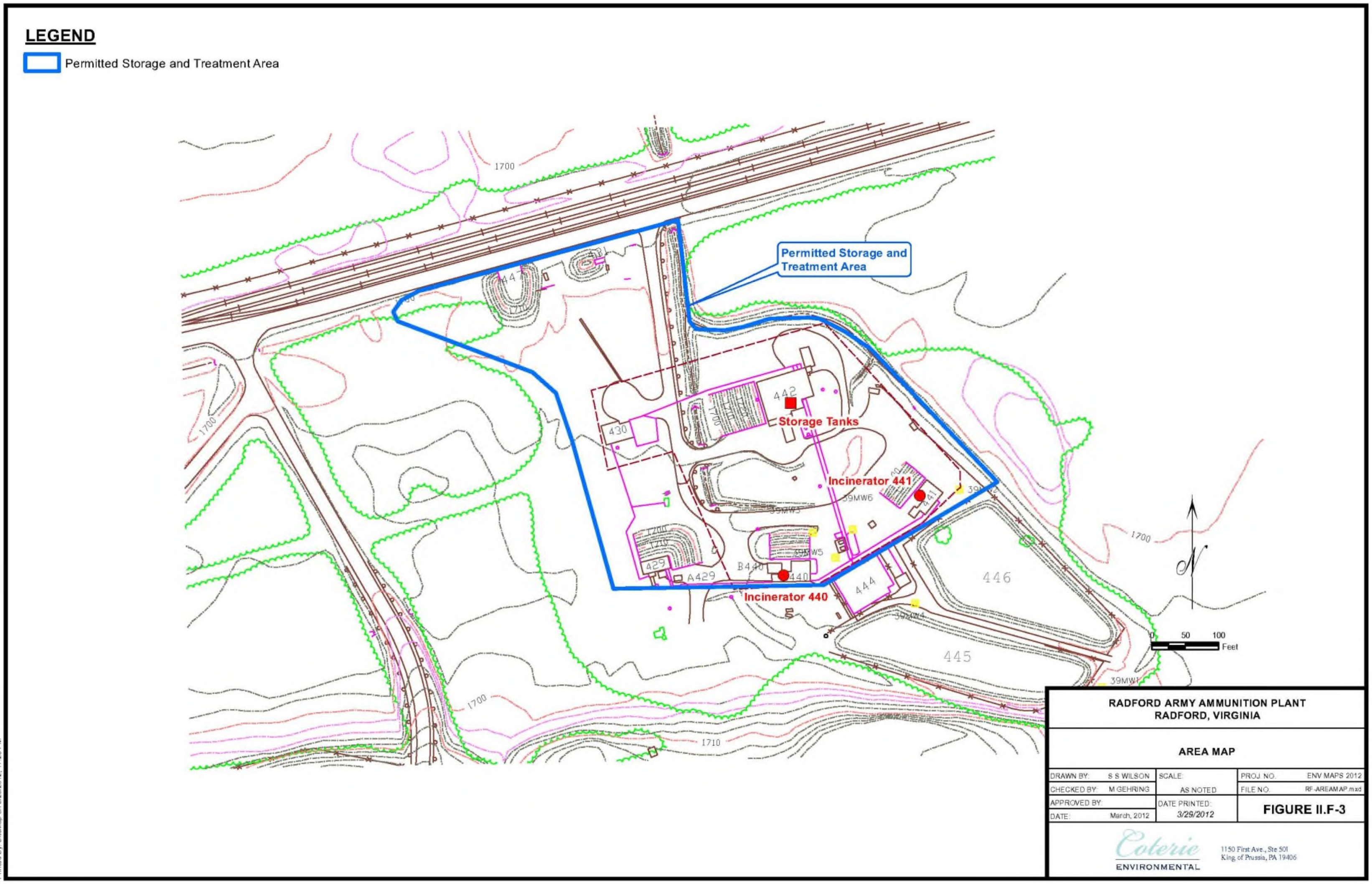


Figure II.F-4 – WPI Schematic

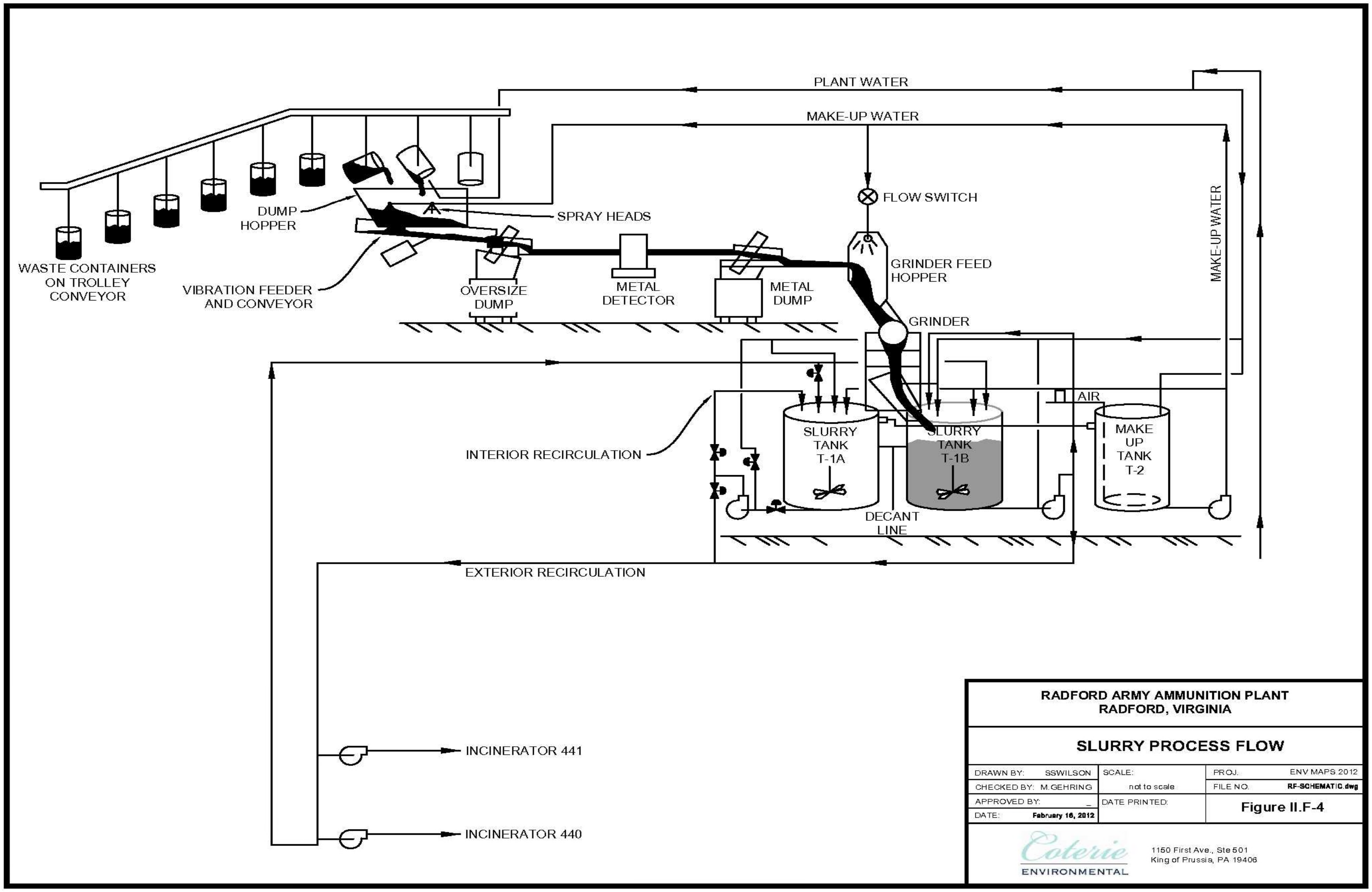


Figure II.F-5 – Logic Diagram

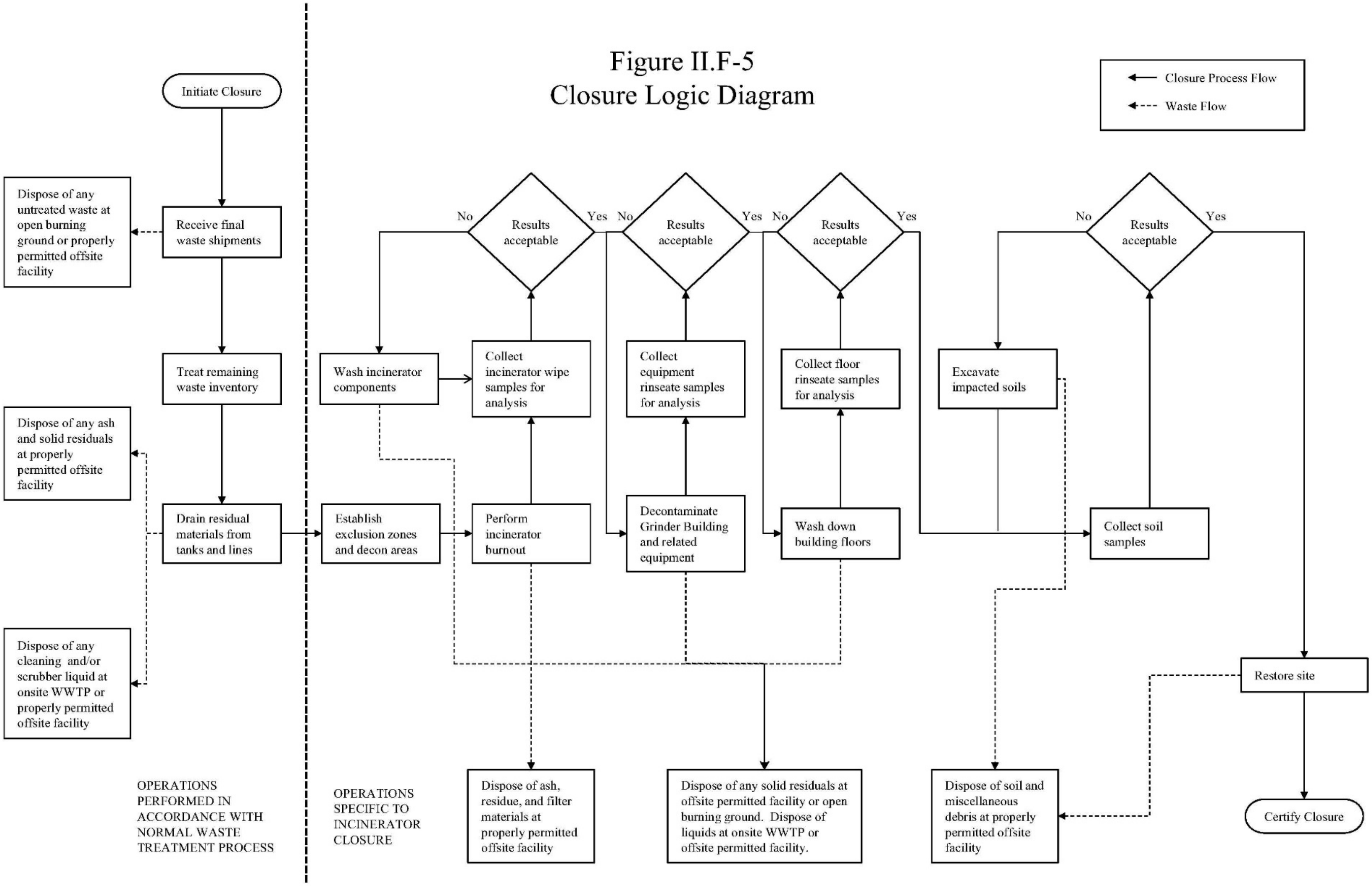


TABLE II.F-1 - APPENDIX VIIII CONSTITUENTS CONTAINED IN WASTES TREATED AT THE INCINERATOR

Parameter	**CAS #**	Analytical Method **(SW-846)**	Estimated Quantitation **Limits(μg/L)**
Antimony sulfide (Antimony Compounds N.O.S.)	(Antimony) 7440-36-0	6020	1
Arsenic	7440-38-2	6020	5
Barium N.O.S.	(Barium) 7440-39-3	6020	10
Benzene (possibly in alkylbenzene sulfonic acid)	71-43-2	8260B	5
Chlorobenzene	108-90-7	8260B	5
Carbon tetrachloride (1.5 % of Chlorowax 70)	56-23-5	8260B	5
Chromium nitrate (Chromium compounds N.O.S.)	(Chromium) 7440-47-3	6020	5
Copper chromite	12053-18-8	6020	5
Dibutyl phthalate	84-74-2	8270C	10
Diethyl phthalate	117-81-7	8270C	10
2,4-Dinitrotoluene	121-14-2	8091	0.08
Diphenylamine	122-39-4	8270C	10
Formaldehyde (found in phenolic resin)	50-00-0	8315A	25
Hexachloroethane	67-72-1	8270C	50
Lead N.O.S.	(Lead) 7439-92-1	6020	1
Mercury	7439-97-6	7470A	2
Mercuric chloride (CAS# 7487-94-7) (Mercuric Compounds N.O.S)	(Mercury) 7439-97-6	7470A	2
Methyl chloride	74-87-3	8260B	5
Methylene chloride	75-09-2	8260B	5
Nitroglygerin	55-63-0	8332	10 mg/L
2-Nitrosodiphenylamine (2-NDPA)	119-75-5	8330B	10
N-Nitrosodiphenylamine (N-NDPA)	311432-60-7	8330B	10
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HM)	2691-41-0	8330B	10
Total Phenols (found in phenolic resin)	108-95-2	9066	5
Silver	7440-22-4	6020	2
Toluene	108-88-3	8260B	5
1,3,5-Trinitroperhydro-1,3,5-triazine (RDX)	121-82-4	8330B	10

N.O.S: Not Otherwise Specified. Signifies those members of the general class not specifically listed by name in Appendix VIII of 40 CFR Part 261.

TABLE II.F-2 – ANTICIPATED CLOSURE SCHEDULE

Days From Beginning of Closure	Event
- 45	Notification of Department
0	Receive last volume of waste
0-2	Treat/Incinerate final volume of waste
2-5	Remove residuals from tanks
5-7	Incinerator burnout
7-10	Remove incinerator ash, scrubber water, and scrubber sludge
10-15	Select tentative locations for background sampling, seek approval from Department
15-20	Inspect for cracks in secondary containment, building floors, and sumps
20-30	Clean and decontaminate tanks
20-30	Visually inspect incinerator, remove solid residue
30-35	Remove fabric filter and scrubber packing material
30-50	Dismantle, decontaminate, remove tanks and equipment
50-55	Visually inspect, seal cracks and gaps in structures
55-70	Decontaminate incinerators (if necessary)
55-70	Decontaminate structures
55-75	Sampling - structures, wash water, Incinerator
55-100	Sample analysis
55-75	Soil sampling
100-125	Soil removal (if necessary)
90-125	Repeat sampling and analysis (if necessary)
110-140	Additional soil removal (if necessary)
90-150	Repeat sampling and analysis (if necessary)
180	Completion of closure activities
240	Submit signed closure certification to the Department

Times, in days, are from the date upon which closure begins.

Attachment II.Fa - Closure Plan for the EWI-CWP Complex

II.Fa.1. Introduction

This Closure Plan has been prepared for the EWI-CWP complex at the RFAAP. This section presents the purpose of the Closure Plan, background information on the RFAAP and the EWI-CWP complex, and a summary of information contained within the Closure Plan.

II.Fa.1.a. Purpose

This Closure Plan has been prepared for the facility as part of a Hazardous Waste Management Permit Application for the RFAAP EWI-CWP complex. The purpose of the Closure Plan is to develop a closure strategy that assures the RFAAP will close the hazardous waste facilities in a manner that:

a. Minimizes the need for further maintenance;

b. Controls, minimizes or eliminates, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated run-off, or hazardous waste decomposition products to the ground or surface waters or to the atmosphere; and

c. Complies with the closure requirements of 9 VAC 20-60-264, 40 CFR §§264 Subpart G and 264.197 and 264.351.

II.Fa.1.b. Background

This section provides a brief overview of the operations at RFAAP and those operations performed at the EWI-CWP complex.

RFAAP Operations

The RFAAP encompasses approximately 4,104 acres and is located in southwest Virginia within Pulaski and Montgomery Counties as shown in Figure II.Fa-1. The New River separates Pulaski and Montgomery counties and also divides the RFAAP into two portions commonly known as the Horseshoe Area and Main Manufacturing Area. These two areas and the approximate boundary of the RFAAP are shown on Figure II.Fa-2.

The EWI-CWP complex is located within the north central portion of the Horseshoe Area as shown in Figure II.Fa-2 and is used for the onsite incineration of hazardous and non-hazardous energetic wastes. Figure II.Fa-3 shows the boundary of the area and the locations of the actual structures.

RFAAP is a government-owned, contractor-operated (GOCO) industrial installation responsible to the U.S. Army. The mission of the RFAAP is to manufacture propellants, explosives, and chemical materials as assigned. As a GOCO operation, RFAAP has both Government and Contractor organizations. For the purpose of this permit application, the facility consists of all contiguous portions of the RFAAP. The facility specifically includes both the Horseshoe Area and the Main Manufacturing area. Wastes from onsite activities (including those of both the operating contractor and tenants) are stored and treated at the EWI-CWP complex.

The facility was first constructed in 1940 and began operations producing smokeless powder (single base, double base, and triple base propellants) in 1941. Since that time various processes/products have been added to the facility including production of cast propellants, trinitrotoluene (TNT), commercial propellants, and load, assemble and pack facilities. Specific operations vary based upon contracted capacity and products from the Department of Defense and U.S. allies.

EWI- CWP Operations

Operations included in the EWI-CWP complex include grinding, tank storage and treatment, and incineration. The following buildings and structures are specifically included within the EWI-CWP complex and are used to either store or treat hazardous wastes:

- The Grinder Building (identified as Building 613), where wastes are transported prior to treatment and are ground into small pieces prior to being mixed into the slurry and incinerated in the rotary kiln incinerators. The Grinder Building houses the permitted hazardous waste storage tanks, including the makeup water tank, the decant water tank, and the three kiln storage tanks, as well as the grinder tanks. The other tanks housed within the Grinder Building (the firewater collection tanks) are not hazardous waste storage or treatment tanks. The Grinder Building also includes a SWECO vibratory separation system that can be used to prepare the wastes for offsite shipment if necessary;

- Rotary Kiln Incinerators 616 and 617, where the slurried wastes are thermally treated in accordance with this Permit, the applicable RCRA requirements, and the requirements of the Hazardous Waste Combustor National Emission Standards for Hazardous Air Pollutants (HWC NESHAP);

- The Contained Burn Chamber (CBC) (Account 615-CBC-50202), where hazardous wastes that cannot be slurried are thermally treated in accordance with this Permit, the applicable RCRA requirements, and the HWC NESHAP; and

- The CBC and Car Bottom Storage/Loading Building (henceforth referred to as the Loading Building and identified as Building 614), where hazardous wastes are brought prior to treatment and are configured into batches for treatment in the CBC and where metal items targeted for decontamination are loaded onto carts for the Car Bottom Oven.

In addition, the following additional accounts are located within the area. These buildings or units do not manage hazardous wastes but are associated with the overall operations of the facility:

- The Car Bottom Oven (Account 615-R-50006), where large pieces of metal, such as production equipment and piping, are decontaminated in accordance with the State of Virginia Air Pollution Control Laws (the treated items are not hazardous wastes);

- The Operations Control Center (OCC) Building, identified as Building 610, where operators direct remote operation of the Grinder Building, the rotary kiln incinerators, the CBC, the Car Bottom Oven, and the Small Decontamination Oven;

- The Maintenance Storage Building, identified as Building 611, where parts and pieces of the thermal treatment systems and ancillary equipment are brought for maintenance; and,

- The Motor Control Center (MCC) Building, identified as Building 612, where all of the programmable logic controllers (PLCs) and controls for the various system components are housed.

Specific operations that are performed at the EWI-CWP complex are described below. Figures II.Fa-4 through II.Fa-6 show how the wastes are processed through the complex.

1. Waste materials are transported from production areas in 20-gallon containers to one of several central accumulation areas. These areas are outside of the EWI-CWP complex. (Note: the wastes are accumulated for no more than 90 days and therefore these buildings are not permitted container storage facilities).

2. At the Grinder (Building 613), waste tubs are loaded onto a conveyor and processed with ample amounts of water through a grinder and cutter to ensure a uniform particle size for treatment in the rotary kiln incinerators. This same grinding system is used along with the SWECO system if it is necessary to

ship wastes offsite. When being treated onsite, the slurried wastes flow into one of three slurry tanks for storage prior to treatment in the incinerators. These slurry tanks are not completely emptied every 90 days; therefore, these tanks have been permitted as greater than 90-day hazardous waste storage tanks. Water for grinder operations is provided either by the plant process water system (fresh water) or contaminated water stored in the makeup water tank. The contaminated water is generally non-hazardous but the tank is managed as hazardous waste storage out of an abundance of caution.

3. Once selected for treatment, slurried wastes are circulated first through an in-building recirculation loop and then through an external recirculation loop. The external loop supplies feed to both of the rotary kiln incinerators. With the loop, operators can feed one or both of the rotary kiln incinerators a continuous supply of slurried wastes for treatment. Each incinerator is equipped with an extensive air pollution control (APC) system that is used to treat the resulting emissions prior to discharge to the atmosphere.

4. Those wastes that cannot be processed through the grinder are taken to the Loading Building and loaded into bays for batching to the CBC. These container storage areas operate as staging areas for the CBC only and do not store wastes on any type of long-term basis. Therefore, they are not permitted as container storage areas.

5. From the Loading Building, wastes are loaded into a tray and are transferred to a relay system that moves the wastes from the Loading Building out to the CBC. A remotely operated transfer system at the CBC is used to load the tray of wastes into the CBC. Once loaded into the CBC, the wastes are batched through a thermal treatment cycle and the resulting off-gas is bled at a controlled rate to the downstream afterburner and then through ductwork to the incinerators' secondary combustion chamber and APC equipment. Either incinerator is able to receive the off-gas stream from the CBC depending on which system is operating. Precautions are in place to make sure that CBC off-gases are not transferred to a non-operating incineration system.

6. Residue from the rotary kiln incinerators is collected in the kiln wet ash system and under the baghouse in a 55-gallon drum. Residue remaining in the CBC pans is vacuumed from the pans and collected in a 55-gallon drum at the Loading Building. Once full, these drums are transferred to the central accumulation area located in the EWI-CWP complex. The ash is staged onsite pending sample analysis and is then disposed in a properly permitted offsite disposal facility.

7. Non-hazardous contaminated combustible wastes are loaded into the kilns through a conveyor and shredder assembly located at each kiln. As required

by the HWC NESHAP, each container is weighed and recorded prior to entering the kiln shredder assembly.

8. Non-hazardous contaminated metallic items are transported to the Loading Building prior to decontamination. The wastes are then transferred manually or with the assist of a forklift to the Car Bottom Oven and decontamination oven to facilitate decontamination of the items before they are either recycled or disposed.

II.Fa.2. Hazardous Waste Characteristics Analysis

This section provides a general discussion of the types and sources of hazardous wastes that are stored and treated at the EWI-CWP complex. This information includes the general types of wastes managed, specific waste streams, and maximum hazardous waste inventory.

II.Fa.2.a. General Waste Types

The hazardous wastes that are managed (treated and stored) at the EWI-CWP complex include hazardous and non-hazardous energetic waste materials generated at the facility. The wastes include production wastes, spill “cleanup” residues, and energetic contaminated combustible and non-combustible materials. Those wastes that are hazardous are generally hazardous due to their ignitability (D001), reactivity (D003), or toxicity for metals or certain organic constituents. In addition, several listed wastes may be treated in the EWI-CWP complex. These include discarded commercial chemical products that result from spills in the various process areas or other commercial chemical products that are unsuitable for use. A detailed description of the wastes is provided in the Waste Analysis Plan in Attachment II.Ba of this Permit.

II.Fa.2.b. Waste Composition

The composition of the wastes fed to the EWI-CWP varies over time due to changes in the production schedule at the RFAAP. Generally, these wastes include miscellaneous energetic wastes. For purposes of classification under RCRA, these wastes have been segregated into waste groups that differ based on their primary components and RCRA waste codes. There are no wastes stored or treated in the EWI-CWP complex that are incompatible with one another.

II.Fa.2.c. EWI-CWP Maximum Hazardous Waste Inventory

At any given point in time, the hazardous wastes present in the EWI-CWP complex may be as follows:

- Grinder Building (Bldg 613):

- Up to 18,000 gallons of waste slurry in three 6,000-gallon hazardous waste storage tanks, 10,450 gallons of potentially hazardous liquid waste in the make-up tank, and up to 13,100 gallons of potentially hazardous waste in the decant tank (note that the wastes in the makeup tank and decant are treated as hazardous out of an abundance of caution and will likely be non-hazardous water-based solutions);

- Accumulated waste awaiting processing in the Grinder Building (quantity varies based on production schedule but can be up to 6,000 pounds, including the waste on the conveyor and the waste in the staging area);

- Note that at no time may the energetic material in the building exceed 6,000 pounds whether the material is mixed into a slurry, processing through a grind, or being staged for a subsequent grind;

• Accumulated waste awaiting processing in the CBC Loading Building bays (maximum quantity at any one time in this building is 1,200 pounds);

• Potentially hazardous waste ash in satellite accumulation in the thermal treatment systems, including up to one, 55-gallon drum of kiln ash per kiln system, one, 55-gallon drum of baghouse ash per kiln system, and one 55-gallon drum of CBC ash at the Loading Building; and

• Potentially hazardous waste ash stored in the central accumulation area adjacent to the Loading Building (with storage of up to 152, 55-gallon drums).

While the quantities listed above reflect the maximum potential hazardous waste quantities at the EWI-CWP complex at any point in time, the actual inventory of waste energetic material in the area prior to closure should be significantly less, as all of the wastes needing treated in the incinerators or the CBC would be treated and the waste contained in slurry lines and tanks would be burned out and flushed with water prior to initiating closure.

II.Fa.3. Review of Potential Impacts

This section contains a review of potential impacts to soil and groundwater at the EWI-CWP complex as a result of hazardous waste management activities. These potential impacts will be evaluated and appropriately addressed as part of the closure activities.

II.Fa.3.a. Geological Considerations

In assessing the potential impacts to the surrounding area, it is important to consider the physiographic, geologic, hydro-geologic, and hydrologic conditions in and around the EWI-CWP complex.

RFAAP is located in the Appalachian Highlands in the portion characterized as the valley and ridge physiographic province. Elongated, narrow, ridges consisting of relatively resistant sandstones characterize this area and dolomites strike southwest to northeast with narrow valleys of varying length and width between these ridges. This topography is the result of a complex sequence of thrust faulting and folding over the past 100 million years. Sedimentary rocks consisting of limestone, dolomite, and minor sandstone underlie the area. These rocks are complexly folded, faulted, and fractured. RFAAP is constructed above the Elbrook Formation, which is of the Cambrian Era and consists of dolomite, shale, and minor limestone. Typical features of this formation are sinkholes, solution channels, and a pinnacled bedrock surface. Surface coverage consists primarily of residual silts and clays derived from the underlying rock. Alluvial deposits are also present along the banks of the New River and adjoining flood plain. These alluvial soils consist of Micaceous silts and sandy clays underlain by coarser deposits of silty and clayey sands and gravel. Cobbles and boulders are scattered within the alluvial deposits.

The EWI-CWP complex sits on flat terraced land adjacent to the New River. The underlying soils in this portion of the plant consist primarily of 1 to 9 inches of top soil, underlaid by varying fill soil from 4 to 7 feet. The fill soil consists largely of lean clay with sand. Below this, alluvial terrace soils associated with past sediment deposition extend to approximately 17 to 24 feet. These soils generally consist of sandy lean clay, clayey sand, silty sand, poorly graded sand with clay, and poorly graded gravel. The soils contain mica, which is indicative of their history of being transported by the river from the mica-rich geology of the Blue Ridge Mountains to the east. Below the alluvial deposits are residual soils and then disintegrated rock. The residual soils consist largely of gravel with varying amounts of sand, silt, and clay and extend from approximately 22 to 30 feet, the maximum depth explored. The disintegrated rock was encountered while drilling at depths between 19 and 24 feet.

Groundwater in the vicinity of the RFAAP occurs at relatively shallow depths in both soil and bedrock and is typically recharged by precipitation and stream flows. Groundwater in the terrace formations typically is found near the soil-bedrock interface. In flood plain areas, groundwater is typically present within the alluvial material. In the limestone and dolomite formations, groundwater is typically found in fractures and solution channels. At the EWI-CWP complex, groundwater was encountered between 19 and 24 feet.

The New River flows through the RFAAP and separates the main area of the plant from the Horseshoe area, where the EWI-CWP complex is located. In addition, the river serves as the dividing line between Pulaski and Montgomery counties. Surface water flows, including those in the EWI-CWP area, generally drain to the New River with the exception of portions of the southeastern area of the plant.

Surface water in this area flows to Stroubles creek, which then empties into the New River.

II.Fa.3.b. Impacts to Soil

In accordance with the EPA Corrective Action Permit, a Plant-wide Background Study was completed in September 2000. The soil samples collected during the Plant-wide Background Study were analyzed for all of the hazardous constituents listed in Appendix VIII of 40 CFR Part 261. The report on these analyses was submitted to and approved by the DEQ in May 2002. Data from this sampling event or another existing and more recent event will be used in the evaluation of soils during closure.

II.Fa.3.c. Impacts to Groundwater

Groundwater in the vicinity of the EWI-CWP complex was evaluated for potential impacts as part of the RCRA Facility Investigation (RFI)/Corrective Measures Study (CMS) of solid waste management unit (SWMU 39) near the existing incinerators. The results of this study were submitted to the DEQ in August 2005. This data or other existing data from a more recent groundwater investigation will be used in the evaluation of groundwater during facility closure.

II.Fa.4. General Closure Analysis

This section presents the general goals and criteria for developing a closure strategy and developing criteria for closure. Feasible options for closure of the facilities are reviewed and evaluated with regard to regulatory requirements and environmental protection, economic feasibility, and practicality.

II.Fa.4.a. General Closure Criteria

As stated in the introduction, the purpose of the Closure Plan is to develop a closure strategy that assures that RFAAP will close the hazardous waste facilities in a manner that:

a. Minimizes the need for further maintenance;

b. Controls, minimizes or eliminates, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated run-off, or hazardous waste decomposition products to the ground or surface waters or to the atmosphere; and

c. Complies with the closure requirements of 9 VAC 20-60-264; 40 CFR §264 Subpart G, and §§264.197 and 264.351.

In accordance with the Virginia Hazardous Waste Management Regulations (VHWMR) and the RCRA, 40 CFR Part 264, Subpart G, RFAAP will close the hazardous waste management units (HWMU) in compliance with 40 CFR §264.111, Closure Performance Standards. RFAAP intends to remove all hazardous waste and all hazardous waste constituents at the EWI-CWP complex at the time of closure to levels at or below the standards established herein (clean closure). This clean closure will be accomplished via one of two methods:

- Comparison to background levels - RFAAP will confirm that the levels of constituents remaining in the hazardous waste management unit, equipment, structures, soils and/or sub-soils are below detection or, when statistically evaluated, are below representative background levels.

- Risk Assessment - The facility may demonstrate that the concentrations of hazardous constituents detected and remaining in the hazardous waste management unit, equipment, structures, soils and/or sub-soils do not pose an unacceptable level of risk to human health and the environment.

If a risk assessment is performed to determine compliance with the closure standards, the risk assessment criteria shall comply with one or more of the following DEQ guidance documents or other DEQ risk-based guidance, as applicable:

- Virginia Unified Risk Assessment Model (VURAM) and VURAM User's Guide (2016), as amended by the DEQ. Modeling shall also include fate transport modeling with the Seasonal Soil Compartment Model (SESOIL) as a preferred model.

- DEQ Guidelines for Developing Health-based Cleanup Goals Using Risk-based Assessment at a Hazardous Waste Site Facility for Restricted Industrial Use, June 1995.

- DEQ's Draft Guidance Manual for Closure Plans and Post Closure Plans for Hazardous Waste Management Facilities, dated September 28, 2001.

Any and all risk-based standards used in certifying a risk-based closure will be established in concert with DEQ. As part of this process, RFAAP will submit a risk assessment protocol for review and approval by DEQ and will also revise this closure plan as appropriate. If closure to residential standards/use is not possible, then the option to pursue restricted-use closure (*e.g.*, commercial or industrial use) may also be exercised.

II.Fa.4.b. Closure Alternatives

Various alternatives are available for closure of the EWI-CWP. The various components of the facilities that will need to be addressed as part of the closure process include the physical structures included as part of the EWI-CWP as well as the soil and groundwater underlying these facilities.

Closure Alternatives for Structures

Once hazardous waste treatment and/or storage operations cease it will be necessary to partially or completely close the facilities as appropriate. Two basic options are available for closure of these facilities.

First a hazardous waste contractor can dismantle the equipment subject to closure. The dismantled equipment can then be shipped offsite for treatment/disposal. A hazardous waste determination will need to be performed for each waste stream followed by the necessary waste characterization.

The second closure option would require that all waste handling equipment be decontaminated. Once decontaminated the equipment can then be dismantled and disposed of as non-hazardous solid waste or recycled as scrap material. This option will require greater onsite management of decontamination fluids, wash water, decontamination verification, and overall management. However, RFAAP will utilize the Car Bottom Oven to the extent practical, reducing the amount of wash water and decontamination fluids generated. In addition, overall costs should be significantly lower as the only hazardous waste generated that would require offsite treatment or disposal would likely be the decontamination/wash water as opposed to significant quantities of contaminated debris as generated in the first option.

To the extent possible, the Car Bottom Oven will be used to decontaminate structures and equipment within the EWI-CWP complex. Once that option is no longer available, RFAAP will likely decontaminate equipment via other means prior to dismantling based upon the economic advantages and potential for reduced quantities of hazardous wastes.

Closure Alternatives for Soil and Groundwater

Once the closed structures have been decontaminated it will be necessary to address any potential impacts to soil and groundwater. The first step in this process will be to implement a sampling protocol to determine the following:

- If soils under the EWI-CWP structure(s) have been contaminated; and

- If any impacts that did occur have migrated through the soil to the uppermost aquifer.

Once the extent of any impacts is determined, a closure approach for the soils and groundwater will be developed. Three basic closure options are available depending on the impacts encountered:

- Option 1: If no impact to groundwater is encountered, pursue clean closure or risk-based closure for any contaminated soil.

- Option 2: If limited impact to groundwater is encountered, remove source material or "hot spots" and perform limited follow-on monitoring as appropriate.

- Option 3: If significant groundwater impact is discovered, remove source material and/or provide some means of groundwater control.

At this time there are various options for excavating soil for offsite treatment/disposal as well as various onsite and in-situ treatment methods that may be applicable depending upon the exact nature of impacts to soil. For the purpose of this Closure Plan it is assumed that any potential soil impacts will be limited in nature and that soil excavation will be a feasible and cost-effective closure option.

It should be noted that actual closure of the facilities is not anticipated for some time. As such, innovative treatment alternatives may become available that may be more favorable to excavation and offsite treatment/disposal. Based upon the actual extent of any impacts and technological advances, RFAAP may choose to modify this Closure Plan when each unit is closed.

II.Fa.4.c. Partial and Final Closure

Final closure of the EWI-CWP is not anticipated in the near future nor is partial closure anticipated for any portions of the EWI-CWP complex. At such time that closure is expected, this Closure Plan will be reviewed an updated as necessary to reflect any changes to the closure philosophy or expected procedures.

Additionally, should any portions of the facilities be closed prior to final closure, those portions will be closed in accordance with all applicable closure procedures in this Closure Plan or an appropriate updated version of it.

II.Fa.5. Detailed Closure Process

This section presents a detailed description of the closure process that is anticipated for the EWI-CWP complex, considering the closure alternative selected in Section II.Fa.4a. This process will include the following steps:

1. Inventory Removal

2. Site Preparation

3. Closure Construction

4. Soil Treatment

5. Sampling and Analysis

6. Cover System Evaluation

7. Interim Actions

Figure II.Fa-7 provides a flow chart outlining the closure approach that is planned.

II.Fa.5.a. Inventory Removal

The initial step in the closure process will be treatment and removal of the remaining hazardous waste. This includes removal of waste from the Grinder Building and associated tanks, as well as removal of waste from the Loading Building, and ash from the CBC trays, air pollution control system collection points, and the central accumulation area. After receipt of the final quantity of hazardous waste at the facility (or specific portion thereof identified for partial closure), all hazardous waste inventory will be removed by processing through the EWI-CWP system in the usual manner.

Once all waste has been processed, any hazardous waste or waste slurry remaining in storage tanks that cannot be incinerated, any slurry or rinsate resulting from the slurry loop line backflush after completion of incineration of the final hazardous waste batch, and any waste materials in the Loading Building will be removed for treatment or disposal as hazardous waste. In addition, any accumulated hazardous waste ash, including that from the CBC trays, the air pollution control system collection points, and the central accumulation area, will be removed and shipped offsite for treatment or disposal as a hazardous waste.

The tanks that hold waste slurry will be emptied of any remaining waste or waste slurry in accordance with the general steps listed below.

1. Any remaining waste slurry will be collected in containers for disposal as hazardous waste.

2. All tanks other than the kiln slurry tanks will be inspected for propellant fines and cleaned as necessary. The contents of the tanks will be transferred to the slurry tanks.

3. Propellant fines and any material adhering to the sides of the tank will be flushed from the tank using the plant water spray nozzles located within the tank.

4. The slurry tanks will then be flushed with water, again collecting any propellant fines.

5. The slurry tank operation will then be shut down.

After all of the tanks are emptied, the secondary containment structures and the floors and sumps in the Grinder Building and at the incinerators will be visually inspected for any spilled waste. Any waste on the floors will be cleaned up. All sumps will be cleaned by removing waste with non-sparking tools.

Any waste slurry collected from the tanks either initially or after the subsequent cleaning operations will be screened to remove the excess water or mixed with sawdust to absorb all free liquids. This material, along with any solid propellant fines collected during the emptying and cleaning operations, will be manifested to a RCRA permitted offsite treatment or disposal facility that is capable of handling the material in accordance with all state and federal laws or will be treated onsite at the facility's open burning ground. At the time that a decision is made as to the final disposition of these waste materials (*i.e.*, onsite versus offsite treatment), any steps necessary to further prepare and package the wastes for treatment and/or shipment to an offsite facility will be identified and implemented. These procedures will be submitted to DEQ as a Class 1 modification for approval before closure is initiated. Any shipping of hazardous wastes will be done in accordance with all applicable RCRA and DOT requirements.

Any residual liquids emptied from the tanks will be processed in the facility’s wastewater treatment system, if permissible under the facility’s Virginia Pollutant Discharge Elimination System (VPDES) Permit. RFAAP will analyze the liquid to determine if the material is compatible with operations at the biological wastewater treatment plant (WWTP). If treatment is feasible, RFAAP will request a modification to the facility’s VPDES permit to allow such treatment, if necessary. If such treatment is not feasible, the material will be transferred to drums or other acceptable containers and will be characterized as required for offsite disposal. If the material is determined to be hazardous, the material will then be manifested to a RCRA permitted offsite treatment or disposal facility that can handle the waste in accordance with all state and federal laws. If non-hazardous, the material will be transported to an appropriate offsite treatment or disposal facility in accordance with all state and federal laws.

II.Fa.5.b. Site Preparation

Once the remaining hazardous waste inventory is treated, a series of preparatory activities will be performed prior to the start of actual facility closure. These activities will include the following:

1. Delineation of exclusion zones around the various work areas as needed for the safety of workers involved with the closure operations and those of RFAAP staff in surrounding areas. Specific items will be addressed as part of RFAAP safety policies and health and safety plans developed by any subcontractors involved in the closure operations.

2. Establishment of decontamination areas for personnel and equipment involved in the closure operations.

3. Establishment of staging areas for uncontaminated demolition debris, contaminated scrap/debris, contained liquids, and other waste streams including containers for any contaminated material. No waste or contaminated material shall be placed on the ground without a liner.

4. Establishment of temporary facilities required for closure activities (*e.g.*, storage trailers, field office, *etc*.).

5. Visual inspection of all secondary containment and/or building floor/sump surfaces for cracks or gaps. All such cracks or gaps will be sealed with an epoxy sealant to assure that the wash solution will not migrate into or through the material.

6. Other permitting that may be required (*e.g.*, modification of VPDES permit for treatment of wastes generated as part of the closure activities, VPDES storm water permit for construction activities, *etc*.).

Decontamination and Closure of EWI-CWP Combustion Chambers

This section presents the processes that will be used to initiate closure of the hazardous waste combustion chambers. This includes a discussion of the burn-out process and a description of how the waste materials will be contained. Please note that the air pollution control system will be fully functional during this burnout process.

Burn-Out Process

After incineration of the final quantity of hazardous waste, each combustion chamber (*e.g.*, kiln or CBC) will be operated at or above minimum operating temperature for a period of not less than eight hours. During this period only natural gas fuel will be burned and only clean water will be fed to the kilns through the slurry feed system. It is the intent of this burn-out process to destroy any residual waste explosives that may remain within the units.

After the burnout period, the various combustion chambers and the air pollution control systems will be visually inspected for the presence of any accumulated solid residues. If detected, such residue will be removed as noted below.

Burn-Out Process Waste Management

Waste generated and/or accumulated at the end of the burn-out process will be collected, analyzed as specified herein, and properly disposed. The types of wastes that may be encountered include the following:

- Incinerator ash (consisting of the ash and incinerated solids that accumulate in the wet ash system, the evaporative cooler, the baghouse, the adiabatic quench, and the scrubber);
- CBC ash (consisting of ash that accumulates in the CBC pans, as well as within the chamber itself);
- Scrubber water and any scrubber sludge; and
- Fabric filter bags and scrubber packing material (after burn-out process is complete).

These wastes will be managed as described below.

1. All incinerator and CBC ash residue will be analyzed as required for offsite disposal and sent to an appropriately permitted facility. If determined to be hazardous waste via analysis or treated as such through an abundance of caution, the ash will be sent to a properly permitted RCRA facility.

2. Scrubber water will be processed in the RFAAP’s wastewater treatment system and discharged in accordance with VPDES permit regulations if the waste is compatible with treatment processes (the VPDES permit will be modified to allow such discharge as needed). Scrubber water that cannot be processed in the RFAAP wastewater treatment system will be analyzed as required for offsite disposal and sent to an appropriately permitted facility.

3. Scrubber sludge will be analyzed as required for offsite disposal and sent to an appropriately permitted facility. If determined to be hazardous waste via analysis or treated as such through an abundance of caution, the sludge will be sent to a properly permitted RCRA facility.

4. The fabric filter bags and the scrubber packing material will be analyzed as required for offsite disposal and sent to an appropriately permitted facility. If determined to be hazardous waste via analysis or treated as such through an abundance of caution, the bags will be sent to a properly permitted RCRA facility.

Decontamination Verification

Samples will be collected from the EWI-CWP equipment to verify that the decontamination process has been successful before it is dismantled. Wipe samples will be taken from the following locations:

- Refractory of each kiln
- Refractory of each secondary combustion chamber
- CBC internals
- Refractory of the CBC afterburner
- Gas ducts
- Ash hoppers
- Internal surfaces of each evaporative cooler
- Internal surfaces of each baghouse
- Internal surfaces of each adiabatic quench
- Internal surfaces of each scrubber
- Internal surface of each SCR
- Each exhaust stack
- Sumps and containment dikes in hazardous waste areas

A minimum of five wipe samples will be taken from various locations in each of the items specified above. A minimum of five background samples will also be taken. Background samples will be taken from exterior building surfaces in the vicinity of the EWI-CWP complex. The location of background sampling locations will be approved by the DEQ prior to sampling.

Samples will be collected by applying a detergent solution to a piece of 11-centimeter (cm) diameter filter paper (*e.g.,* Whatman 40 ashless, Whatman “50” smear tabs, or equivalent) or gauze pad. The moistened filter paper or gauze pad will be used to thoroughly swab a 100 cm^2 area. A template may be used to assist in the collection of a 100 cm^2 sample. When a template is used, it will be thoroughly cleaned between samples to prevent cross contamination of subsequent samples of the template or disposable templates will be used for each independent sampling location.

The wipe samples collected as part of this process will be analyzed for reactivity as well as for all of the hazardous constituents listed in Table II.Fa-1. The constituents presented in this table represent those hazardous constituents presented in Appendix VIII of 40 CFR Part 261 that are present or are expected to be present in the wastes burned at the EWI-CWP complex. This list was determined through a combination of process knowledge, analytical data, and Safety Data Sheets for RFAAP manufactured products.

The samples will be analyzed for reactivity by the appropriate test method specified in the Waste Analysis Plan. The samples will be analyzed for the presence of hazardous constituents by appropriate methods from SW-846, latest edition. The method with the lowest acceptable detection limit for each constituent of interest will be used. All applicable sample handling and preservation procedures of SW-846 Chapter Three will be observed. At least one blank, which will consist of a moistened filter paper or gauze pad, will be taken daily when sampling is ongoing.

Lack of contamination will be adequately demonstrated if the concentration of a constituent in a wipe sample is equivalent to or less than the concentration of the average background concentration. Those areas from which wipe samples exhibit a concentration of greater than the average background concentration will require further decontamination.

Further decontamination will consist of a high-pressure spray wash similar to that described for the Grinder Building and associated equipment below or will involve scrubbing with a detergent solution. After further decontamination, the subject areas will again be sampled with wipes, analyzed as before, and compared to background. This process will be repeated until all sampled areas are adequately decontaminated or until the decision is made to declare the piece of equipment a hazardous waste and dispose of it accordingly. Wash water will be handled in the same manner as the decontamination wastes described later in this section.

Decontamination of the Grinder Building, Tanks, and Associated Equipment

All tanks and equipment that may have contacted hazardous waste will be decontaminated prior to dismantling. These tanks and equipment include, but are not limited to, the following:

- Slurry tanks (Tanks T30079, T30164 and T30197);
- Make-up tank;
- Grinder tanks;
- Decant tank;
- Waste feed conveyor;
- Pumps;
- Grinders;
- Cutters;
- Tank agitators; and
- Slurry piping lines.

Decontamination of the Car Bottom/CBC Loading Building and Associated Equipment

All equipment within the Loading Building that may have contacted hazardous waste will be decontaminated prior to dismantling. This equipment may include, but are not limited to, the following:

- CBC loading trolley; and
- Ash vacuum system.

The general requirements of these procedures and related waste management practices are included in the following sections.

General Equipment Decontamination Procedures

All potentially contaminated tanks and equipment identified herein will be cleaned and decontaminated prior to dismantling. To the extent possible after disassembly, equipment will be decontaminated in the Car Bottom Oven, provided that system is still in use. If decontamination in the oven is not possible, the decontamination will be performed in accordance with various RFAAP operating procedures and will include the steps noted below:

1. Equipment will be cleaned using properly grounded and inspected pressure washers or steam sprayers until contamination is visibly removed or adequately softened for subsequent scraping and cleaning.

2. Remaining material will be removed by scraping, dipping parts in caustic solutions, *etc*.

3. Equipment bays and/or adjacent areas will be washed down.

4. Any catch basins or floor sumps will be cleaned out.

All wash water will be collected. If deemed compatible, these wash waters will be sent to the onsite WWTP for processing. If incompatible with the materials processed at the WWTP, the collected wash water will be characterized as required to facilitate offsite disposal. All analyses will be performed using the appropriate methods from SW-846, latest edition, or onsite procedures, if appropriate. The method with the lowest acceptable detection limit for each constituent of interest will be used.

The wash downs and analysis of the wash water will continue until the decontamination process is complete. Complete decontamination will be demonstrated by the achievement of the numerical limits of concentration in wash water for all hazardous constituents specified in Table II.Fa-1. Alternatively, complete decontamination may be demonstrated through the use of a statistical comparison of clean, pre-rinse, water with the post-rinse wash water.

If a statistical comparison is used, at least three samples of wash water from each area and three samples of clean water will be analyzed for all constituents in Table II.Fa-1. Complete decontamination will be demonstrated by no significant difference between clean water and wash water for all constituents. The statistical procedure used will be the Student's t-Test with one-tailed t values at the 0.05 level of significance.

After the tanks and other equipment are removed from the facility the following process will be used to wash down and decontaminate all floors, sumps, and containment structures in the Grinder Building and the Loading Building.

1. Any spilled liquids and solids will be removed for disposal.

2. All surfaces will be visually inspected for the presence of additional cracks or gaps discovered upon removal of decontaminated equipment. All such cracks

or gaps will be sealed with an epoxy sealant in order to assure that wash solution will not migrate into or through the material.

3. All surfaces will be washed at least three times with a high pressure, low volume water spray. The specifications for the pressure cleaner will be a minimum achievable pressure of 2000 psi and a flowrate of less than 10 gpm. A minimum of 0.25 gallons per square foot of surface will be used for the pressure wash. Wash water will be collected after each rinse and will be collected separately from each area undergoing cleaning.

Again, all wash water will be collected and after the third washing, the water from each area will be evaluated to determine if it is compatible with the WWTP and treated therein if appropriate. If it is not possible to treat these waters onsite, they will be characterized as required to facilitate offsite disposal.

The wash downs and analysis of the wash water will continue until decontamination is complete. As before, complete decontamination will be demonstrated by the achievement of the limits of concentration in wash water for all hazardous constituents specified in Table II.Fa-1. Alternatively, complete decontamination may be demonstrated through the use of a statistical comparison of clean, pre-rinse, water with the post-rinse wash water.

Management of Decontamination Wastes

Waste generated and/or accumulated as part of the equipment decontamination process will be collected, analyzed as specified herein, and properly disposed. A description of each type of waste generated from the decontamination process and anticipated management practices are presented below.

Decontaminated tanks and equipment will either be sold, used at a different location at the facility, or shipped offsite as scrap. Residues removed from equipment during decontamination at the facility will be collected and analyzed as required to facilitate offsite disposal. If this material is found to be non-hazardous, it will be disposed of onsite or offsite as solid waste. If this material is found to be hazardous, it will be disposed of offsite in accordance with all state and federal laws.

After each washing, the wash water will be collected. If the wash water is compatible with the RFAAP wastewater treatment system it will be processed in said system. Again such wastewaters will be analyzed to assure that they are compatible with the wastewater treatment system processes. If onsite treatment is not feasible, the water will be contained, characterized as required for offsite disposal, and transported offsite (as a hazardous or non-hazardous waste based upon the analyses) in accordance with state and federal regulations.

II.Fa.5.c. Evaluation of Surface and Subsurface Impact

As stated previously, all secondary containment and/or building floor/sump surfaces within the Grinder Building, Loading Building, slurry loop line, incinerators, and CBC will be surveyed for visible signs of a material release or potential release routes (*i.e.*, cracks, gaps, etc.). During site preparation, all such cracks or gaps will be sealed with an epoxy sealant in order to assure that decontamination wash solution will not migrate into or through the material.

Any cracks or gaps sealed with epoxy prior to decontamination shall be investigated at the time of demolition using coring techniques in order to determine whether they fully penetrate the concrete to the soil. Where such cracks are observed to be fully penetrating, a sampling and analysis program will be undertaken to determine the extent of impact. A comprehensive soil sampling and analysis plan will be prepared at the time of closure if necessary and submitted to the DEQ for approval. It is anticipated that the program would progress as follows:

1. Collect soil samples from the cored locations. Survey these locations prior to demolition of the structure.

2. Following demolition and removal of the concrete, relocate the original sample locations using the survey information. These original locations will be the starting points for sampling grids to delineate the horizontal and vertical extent of any impacts.

3. Analyze the soil samples for all of the hazardous constituents listed in Table II.Fa-1 using the analytical methods specified in the latest version of SW-846 at the time of closure.

If there is no apparent release or potential for release observed, a simplified sampling program will be implemented to confirm that a release has not occurred.

II.Fa.5.d. Management and Disposal of Miscellaneous Materials

The cleanup operations will likely result in the generation of other miscellaneous materials that may be contaminated during the cleanup process. Such materials may include but may not be limited to the following:

- Brushes, brooms, mops, buckets and related cleaning supplies;
- Shovels, absorbents, and other tools; and
- Plastic sheeting.

All such waste materials will be characterized as required to facilitate offsite disposal. Based upon these characterizations, the wastes will be disposed at a properly permitted facility in accordance with state and local laws. Liquid wastes may be discharged to the RFAAP wastewater treatment facility in accordance with the facility VPDES permit if such wastes are compatible with the treatment processes.

II.Fa.5.e. Site Restoration

Once the waste materials and decontaminated equipment have been removed from the site, the area within the EWI-CWP complex will be restored. In the event that demolished foundation structures and/or other materials must be excavated for disposal offsite, site restoration will include backfill and compaction of any excavations, grading, and revegetation of the affected area(s). All backfill material must be analyzed before use at the site to ensure that it is "clean fill." The backfill material will be analyzed for the constituents specified in Table II.Fa-1 by appropriate methods from SW-846, latest edition. Additional constituents may be added to the analyses at the time of closure, pending DEQ approval. In the event that it becomes necessary to conduct excavations at the time of closure, a detailed plan of the proposed excavation and site restoration activities will be submitted to the DEQ for approval.

II.Fa.5.f. Certification of Closure

Within 60 days of completion of the closure process, the Permittee shall submit, by registered mail, a certification that the EWI-CWP has been closed in accordance with the specifications of this Closure Plan. The certification shall be signed by an independent, Virginia registered professional engineer. The certification shall also be signed by the Installation Commander or a principal corporate officer or duly authorized representative(s) of the contracted operator pursuant to 9 VAC 20-60-264 and 40 CFR §264.115.

II.Fa.6. Post-Closure Care and Groundwater Monitoring

As previously discussed it is the intent of RFAAP to close the EWI-CWP such that there is unrestricted future landuse of the area. As such, no specific provisions for site monitoring, land restrictions, *etc*. have been included in this Closure Plan. Should site conditions change that would necessitate a change in the closure approach, such post closure care and monitoring may be warranted. If necessary, details of such activities will be developed in a future amendment to the Closure Plan. Section II.Fa.8 of this Closure Plan addresses the general permit modification process that would be necessary to amend the Closure Plan in accordance with 40 CFR §264.112(c).

II.Fa.7. Closure Cost and Schedule

Federal facilities are exempt from the closure financial requirements pursuant to 9 VAC 20-60-264 and 40 CFR §264.140(c).

The DEQ shall be notified at least 45 days before final closure of the the EWI-CWP complex or a component of the complex is expected to begin. The date upon which closure is expected to begin will be the date upon which the final volume of hazardous waste is received at the EWI-CWP. Table II.Fa-2 shows the proposed schedule from notification of the department through submittal of the closure certification. As shown in the table, all closure activities are to be completed within 180 days after receiving the final volume of hazardous waste. Certification of closure shall be made within 60 days after the completion of closure activities. This time frame allows for the required sample analyses, additional decontamination and/or soil removal (as needed), and resampling.

In the event that the RFAAP is unable to complete closure of the EWI-CWP complex within the timeframe established above and outlined in 40 CFR §264.113, RFAAP shall request an extension to the closure period. In making this request, RFAAP shall provide a demonstration that the required closure activities will take longer than 180 days to complete and RFAAP has and will continue to take all steps necessary to prevent threats to human health and the environment from the unclosed but not operating hazardous waste management unit, including compliance with all applicable permit requirements. Pursuant to 40 CFR §264.113(c)(2), the request for an extension of the closure period shall be made at least 30 days prior to expiration of the 180-day period allotted for closure.

If the facility's permit is terminated, or if the facility is otherwise ordered, by judicial decree or Order of the Board, to cease receiving hazardous waste, the EWI-CWP complex or components thereof shall be closed in accordance with the deadlines established in 9 VAC 20-60-264 and 40 CFR §264.113.

II.Fa.8. Modification to Closure Plan

The Permittee shall submit a written request for a permit modification to authorize a change in the approved Closure Plan whenever:

- Changes in operating plans or facility design affect the Closure Plan;
- There is a change in the expected year of closure, if applicable; or
- In conducting partial or final closure activities, unexpected events require a modification of the approved Closure Plan.

The Permittee shall submit a written request for a permit modification including a copy of the amended Closure Plan for approval as follows:

- At least 60 days prior to the proposed change in facility design or operation; or

- No later than 60 days after an unexpected event has occurred that has affected the Closure Plan.

If an unexpected event occurs during the partial or final closure period, the Permittee shall request a permit modification no later than 30 days after the unexpected event. The Department will approve, disapprove or modify this amended plan in accordance with the procedures in 40 CFR Parts 124 and 270. In accordance with 40 CFR §270.32, the approved Closure Plan will become a condition of this Permit.

Figure II.Fa-1 – Location Map

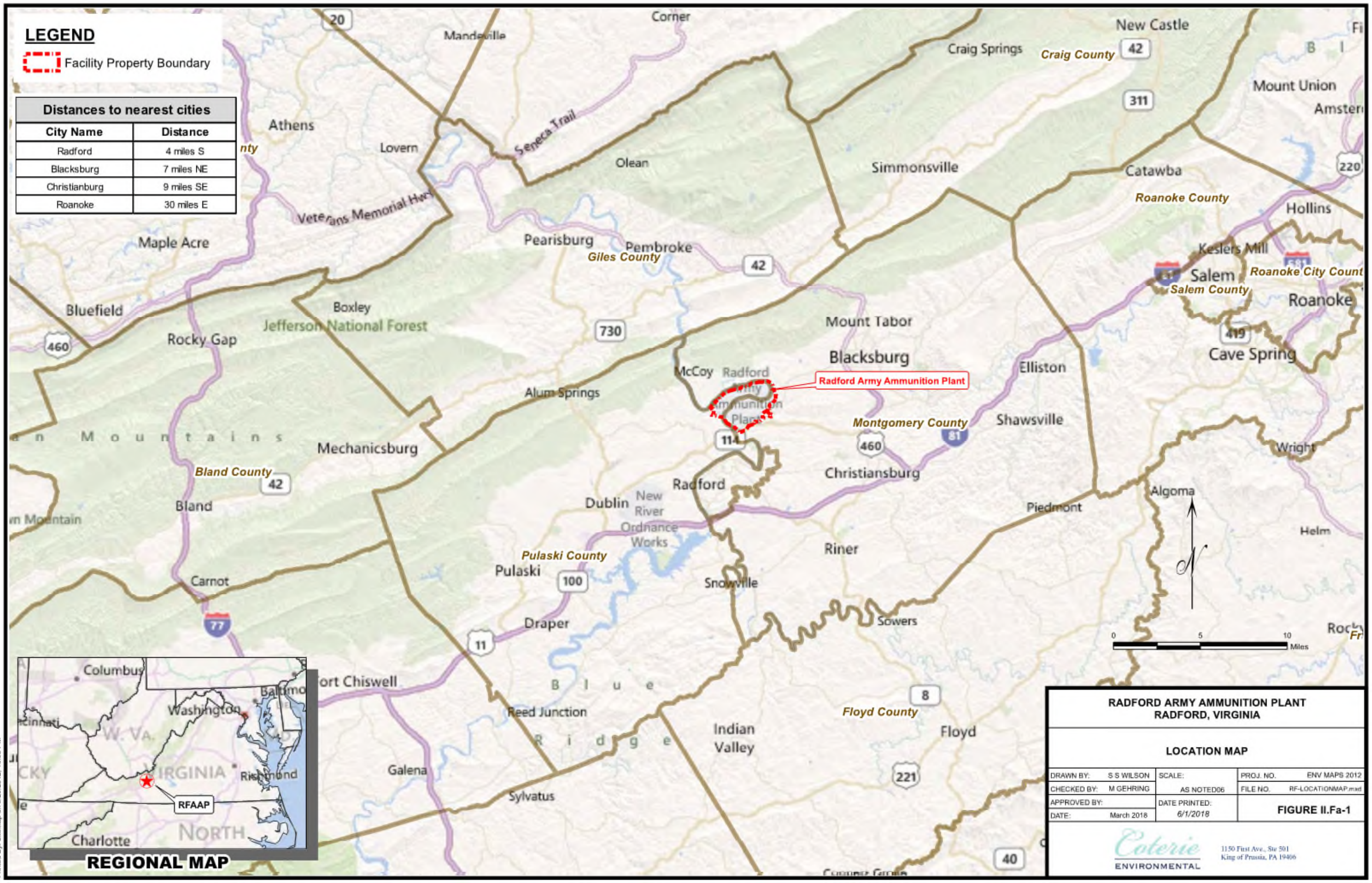


Figure II.Fa-2 – Plot Plan

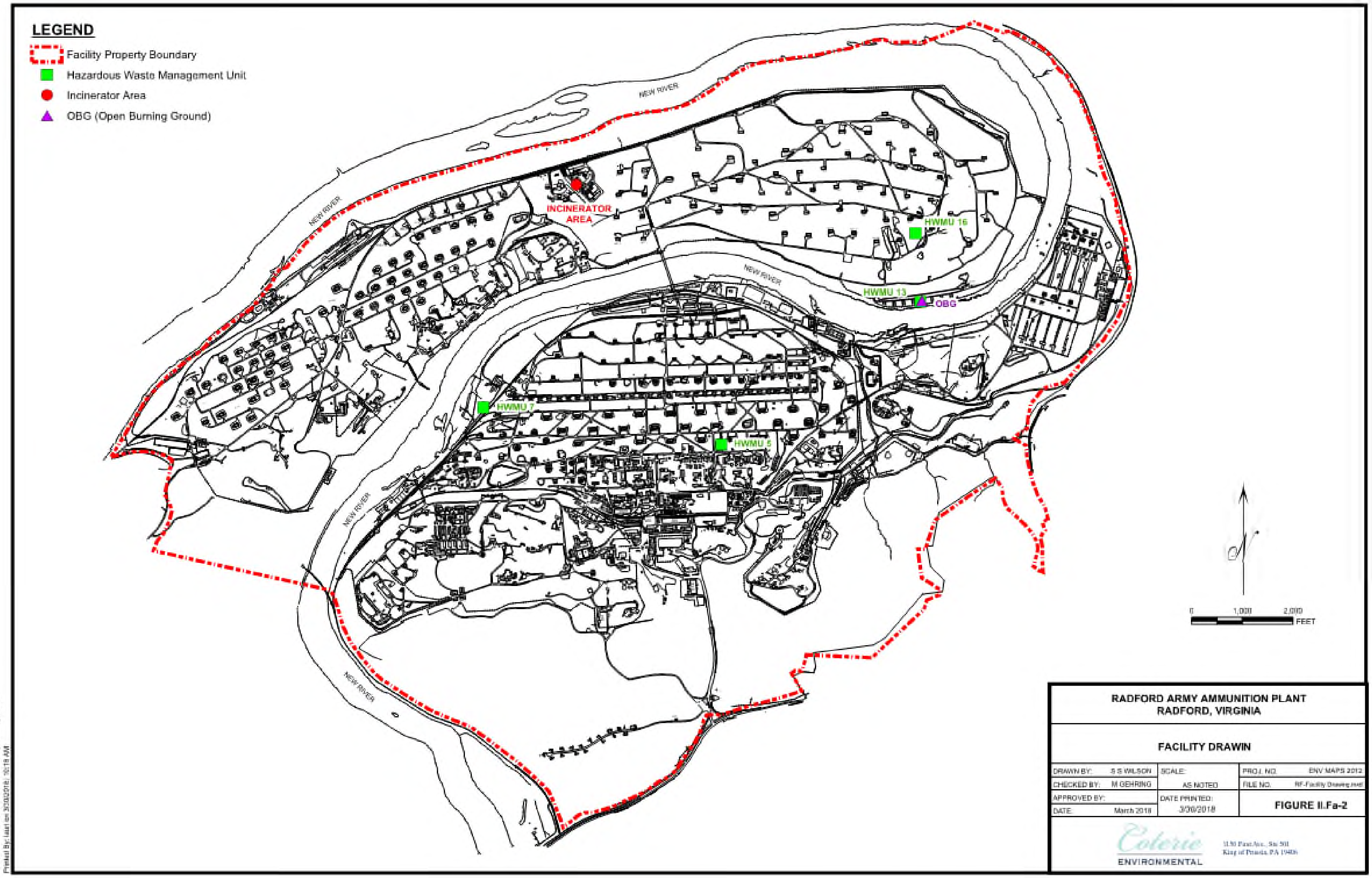


Figure II.Fa-3 – Area Map

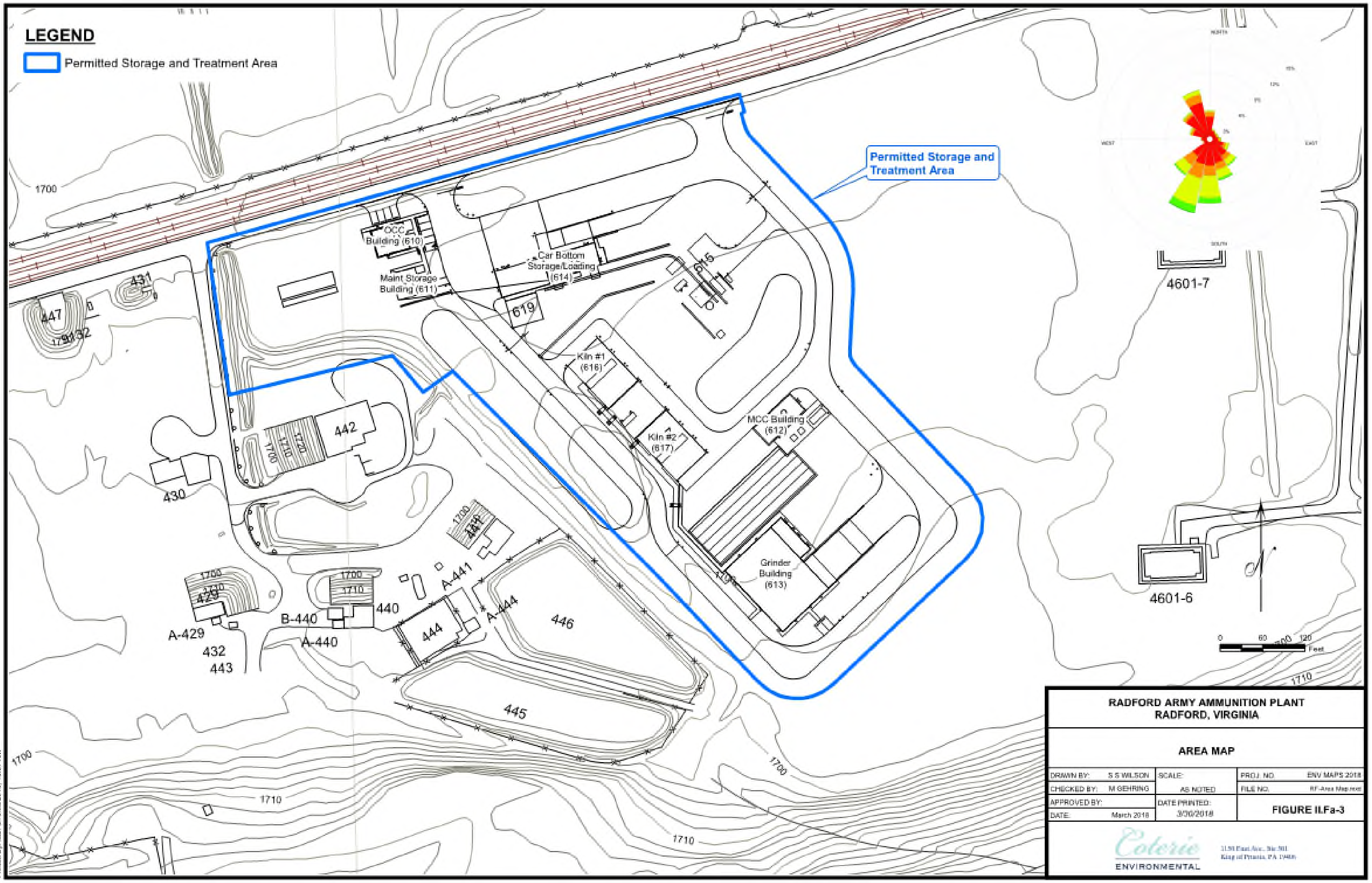


Figure II.Fa-4 - Grinder Building Process Schematic

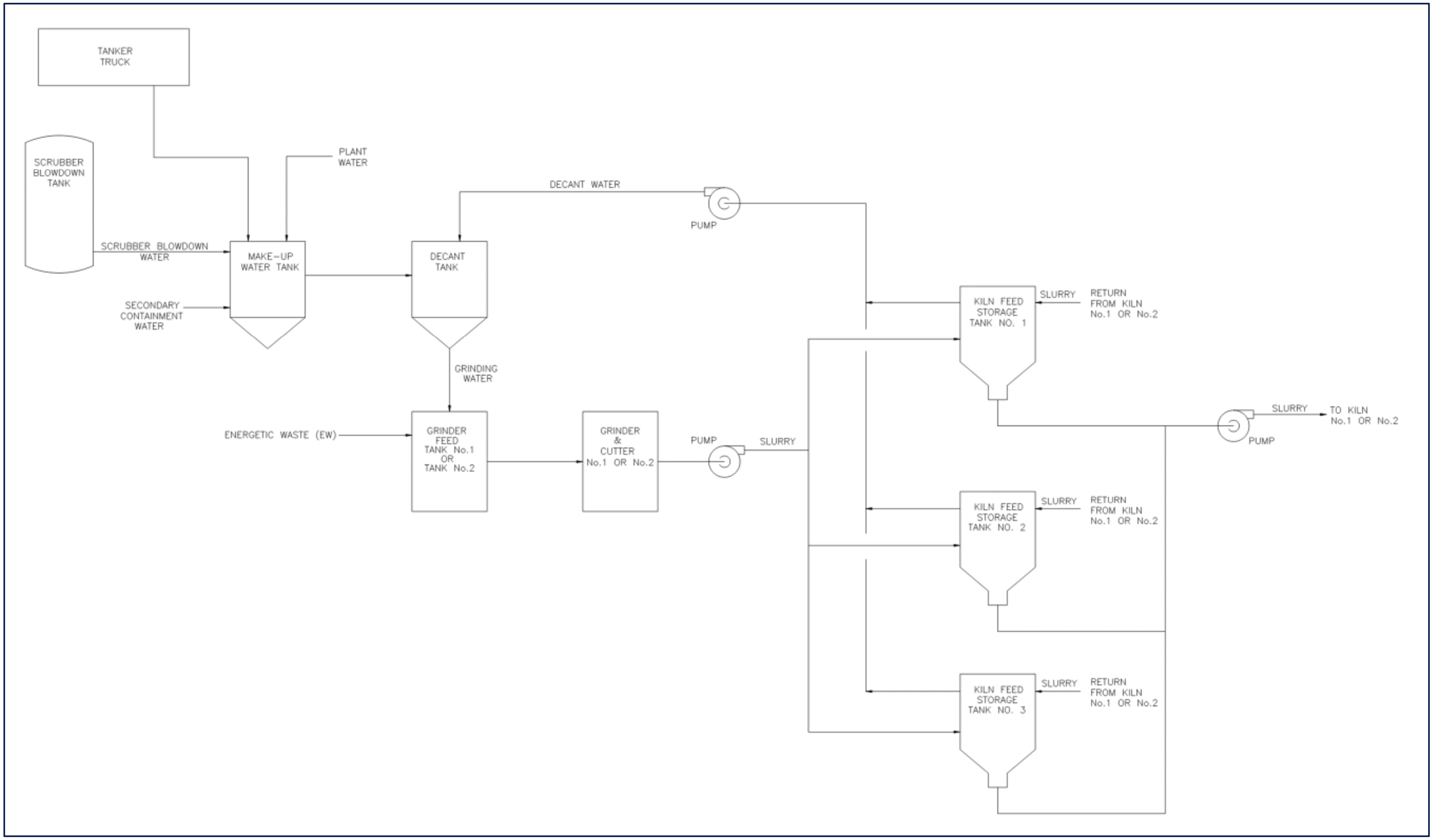


Figure II.Fa-5 - CBC and Car Bottom System Schematic

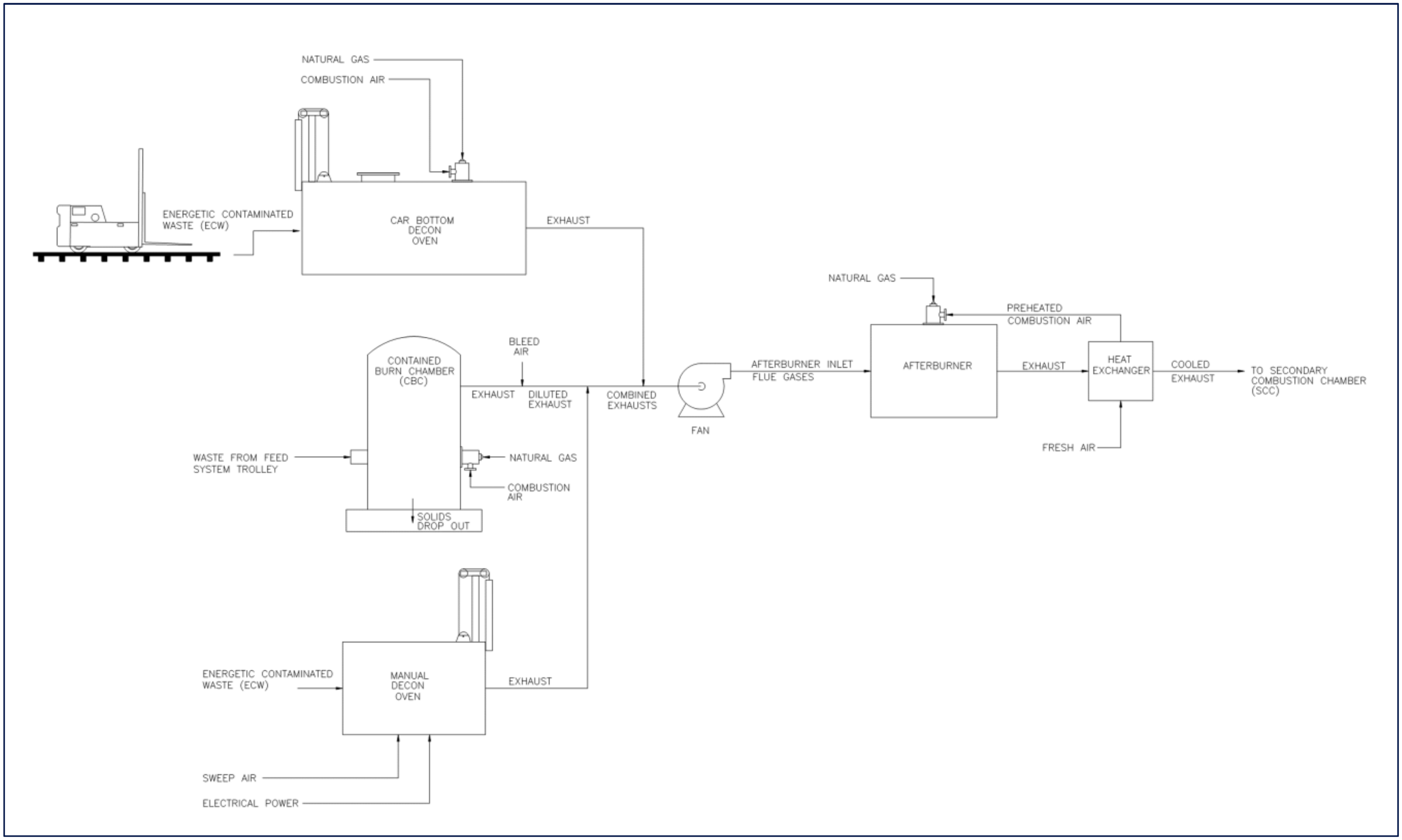


Figure II.Fa-6 - Kiln System Process Schematic (identical for each)

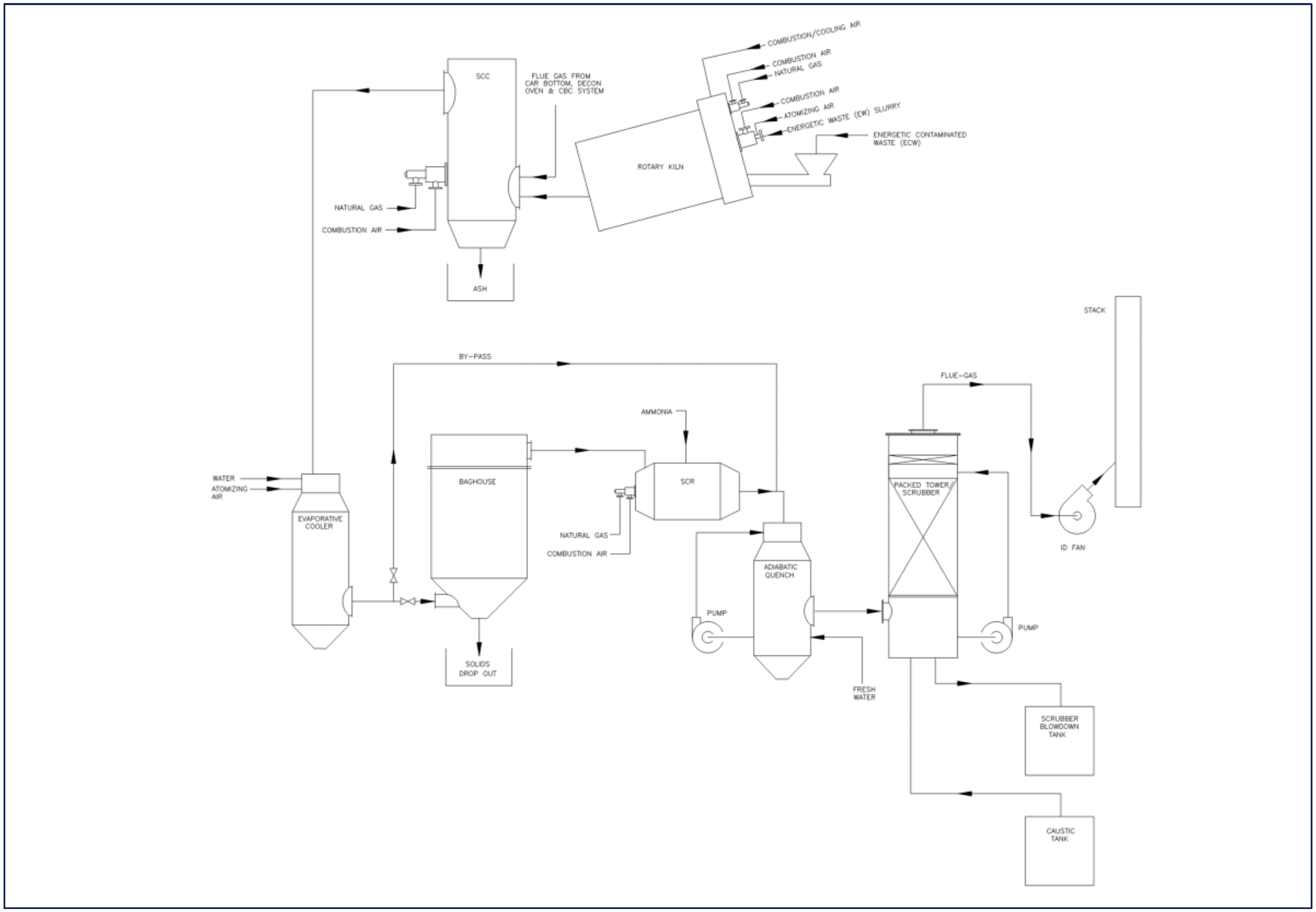


Figure II.Fa-7 – Logic Diagram

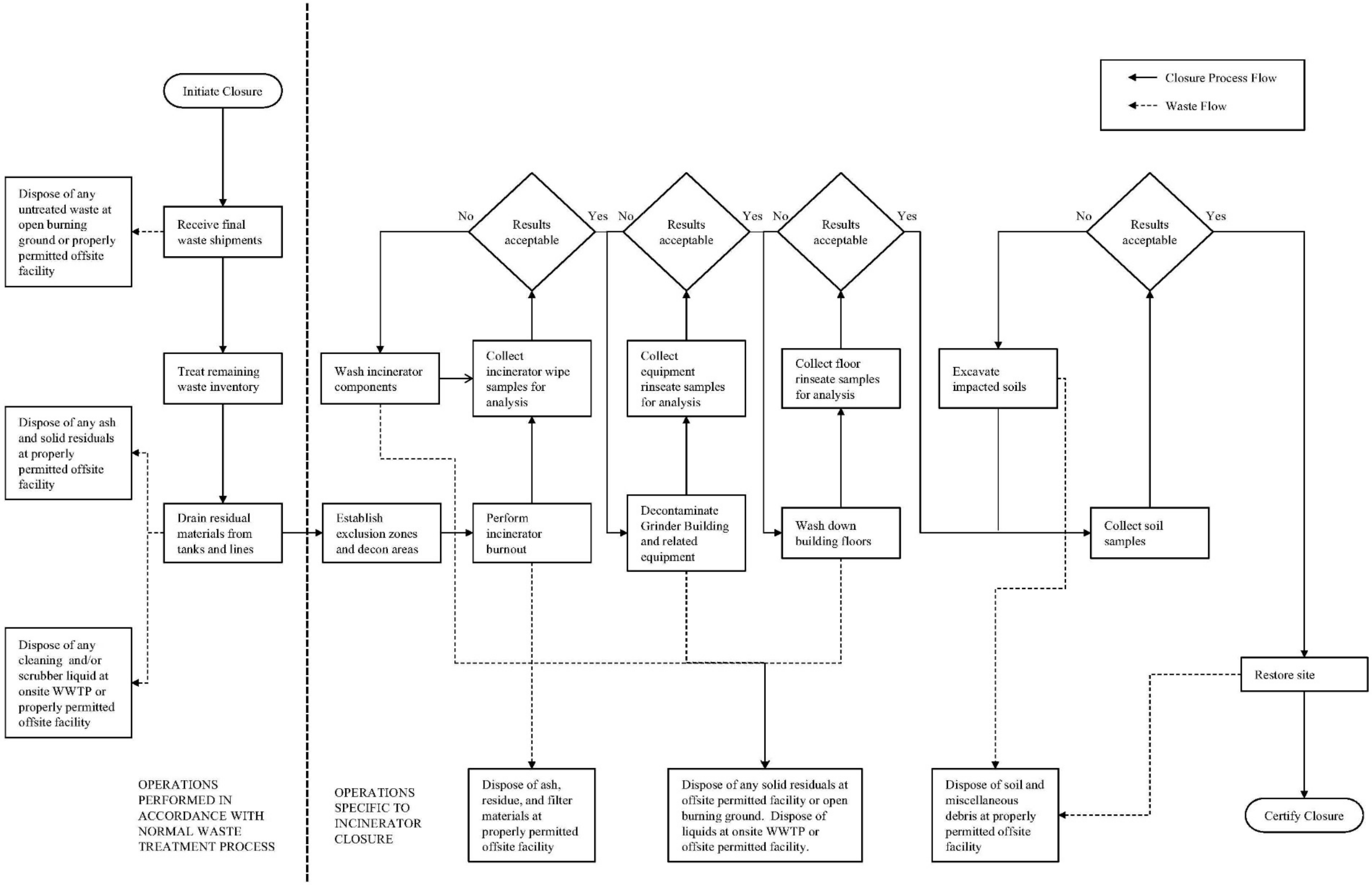


Table II.Fa-1 - Appendix VIII Constituents Potentially Contained in Wastes Treated at the EWI-CWP Complex

Parameter	CAS #	Analytical Method (SW-846)	Estimated Quantitation Limits(μg/L)
Antimony Compounds N.O.S.	(Antimony) 7440-36-0	6020	1
Arsenic	7440-38-2	6020	5
Barium Compounds N.O.S.	(Barium) 7440-39-3	6020	10
Chromium compounds N.O.S.	(Chromium) 7440-47-3	6020	5
Copper chromite	12053-18-8	6020	5
Dibutyl phthalate	84-74-2	8270C	10
Diethyl phthalate	117-81-7	8270C	10
2,4-Dinitrotoluene	121-14-2	8091	0.08
Diphenylamine	122-39-4	8270C	10
Lead Compounds N.O.S.	(Lead) 7439-92-1	6020	1
Mercury	7439-97-6	7470A	2
Mercuric Compounds N.O.S	(Mercury) 7439-97-6	7470A	2
Nitroglycerin	55-63-0	8332	10 mg/L
2-Nitrosodiphenylamine (2-NDPA)	119-75-5	8330B	10
N-Nitrosodiphenylamine (N-NDPA)	311432-60-7	8330B	10
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	2691-41-0	8330B	10
Silver	7440-22-4	6020	2
Toluene	108-88-3	8260B	5
1,3,5-Trinitroperhydro-1,3,5-triazine (RDX)	121-82-4	8330B	10

N.O.S: Not Otherwise Specified. Signifies those members of the general class not specifically listed by name in Appendix VIII of 40 CFR Part 261.

Table II.Fa-2 - Anticipated Closure Schedule EWI-CWP Complex

Days From Beginning of Closure	Event
- 45	Notification of Department
0	Receive last volume of waste
0-2	Treat/Incinerate final volume of waste
2-5	Remove residuals from tanks
5-7	Incinerator and CBC burnout
7-10	Remove EWI-CWP ash, scrubber water, and scrubber sludge
10-15	Select tentative locations for background sampling, seek approval from Department
15-20	Inspect for cracks in secondary containment, building floors, and sumps
20-30	Clean and decontaminate tanks
20-30	Visually inspect EWI-CWP, remove solid residue
30-35	Remove fabric filter and scrubber packing material
30-50	Dismantle, decontaminate, remove tanks and equipment
50-55	Visually inspect, seal cracks and gaps in structures
55-70	Decontaminate EWI-CWP structures (if necessary)
55-70	Decontaminate structures
55-75	Sampling - structures, wash water, EWI-CWP
55-100	Sample analysis
55-75	Soil sampling
100-125	Soil removal (if necessary)
90-125	Repeat sampling and analysis (if necessary)
110-140	Additional soil removal (if necessary)
90-150	Repeat sampling and analysis (if necessary)
180	Completion of closure activities
240	Submit signed closure certification to the Department

Times, in days, are from the date upon which closure begins.

Attachment II.G – Security Provisions

II.G.1 Introduction

Protection of plant personnel, property, resources and operations at the Radford Army Ammunition Plant (RFAAP), a Government-owned, contractor-operated (GOCO) manufacturing facility, is provided by the operating contractor or subcontractor in accordance with Department of the Defense (DOD), Department of the Army (DA), United States Army Joint Munitions Command (USAJMC) and other regulatory guidance and standards. Generally, a subcontractor security guard force is used to perform and enforce prescribed physical security measures.

II.G.2 Security Procedures and Equipment

The RFAAP is a protected military installation, under 24-hour surveillance from a trained security force. RFAAP is considered a "closed post" in that access is controlled at all times by perimeter barriers with limited, manned entry control points. The secured areas of the installation have been designated as Limited and Posted Areas. More than 70 percent of the RFAAP's acreage is enclosed in areas with limited access. All propellant manufacturing, storage, testing and support activities, except for administration, are included in limited areas. Those areas outside of the limited area but within the posted area are restricted to non-energetic activities.

Physical security measures at RFAAP include security guard patrols, manned security posts, perimeter fencing, a badge identification system, lock and key accountability and rotation, vehicle registration, pre-employment background investigations, security lighting, warning signs and physical barriers. At storage sites, tank inlets and disbursing valves are secured with security padlocks.

In addition to the protection offered by the physical barriers, additional security is provided by Security Guard patrols, manned security posts, a badge identification system, lock and key accountability and rotation, vehicle registration, pre-employment background investigations, security lighting, warning signs, and other physical barriers

II.G.3 24-Hour Security System

The security guard force provides 24-hour, 7 day a week security coverage of the RFAAP, performing various security duties across the installation as required to protect the installation and the operations performed therein. Documentation of the security procedures followed is maintained on-site and is available for inspection upon request by DEQ.

II.G.4 Barrier and Means to Control Entry

Entry to the Radford Army Ammunition Plant is restricted 24 hours per day, 7 days a week to authorized personnel. Personnel must be in possession of a valid personnel identification badge or visitor badge. If the person has valid official business at the plant or is accompanying a person who does have such business, posted area visitor badges are issued and the time and date of entry is recorded.

The incinerators are located within the limited area of the plant. Access to this area is strictly controlled through manned security gates that perform an identification check of each person entering the area. Only those persons with valid contractor, government, or visitor identification badges are permitted. At the incinerator area itself, each person going to the incinerator complex must notify the control room and obtain permission. Video surveillance of the permitted storage and treatment area is monitored in the control room by operations personnel.

Protection of sensitive and critical information about the RFAAP and its operations is important to the successful achievement of the RFAAP mission. If adversaries (terrorists, criminals, foreign intelligence organizations or governments, etc.) can gain information about RFAAP, correctly analyze it, and act upon it, the compromise of this information could prevent or seriously degrade mission success. The National Operations Security (OPSEC) Program, which is outlined in National Security Decision Directive 298 (NSDD 298), requires each executive department and agency with a national security mission to have an OPSEC program. Likewise, Department of Defense (DOD) Directive 5205.02E, DOD Operations Security Program, supports the national program and is the basis for the Department of the Army's implementing guidance and policy, Army Regulation 530-1, Operations Security. As a result of these OPSEC and DOD concerns and requirements, further details concerning the security and means to control entry at the RFAAP are withheld from this Permit. Information necessary to demonstrate compliance with 40 CFR § 264.14(b)(2) (ii) is maintained onsite and is available for review and inspection by authorized individuals as necessary.

II.G.5 Warning Signs

At all plant entrances and in areas designated as posted, the following “Condition to Entry” signs have been erected:

CONDITION OF ENTRY
TO
RADFORD ARMY AMMUNITION PLANT

All persons, their possessions and vehicles are liable to search upon entering, during their stay, or upon their leaving this installation. Entry of persons and/or vehicles constitutes consent to search by proper authorities at any time.
The following articles are prohibited on this installation:

- Alcohol
- Firearms, Ammunition and Weapons
- Explosives and Explosives Devices
- Cameras (Unless Authorized in Writing)
- Camera Cell Phones (Unless Registered)
- Intoxicants and Drugs
- Gambling Devices
- Chemical Emission Devices
- Stolen Property and Obscene Literature

By Order of the Commanding Officer

Signs reading “US Government Property - No Trespassing” are located approximately every 500 feet on the installation boundary, except where designated limited area fences are not located on or are reasonably adjacent to the property boundary.

Every 500 feet on limited area fences and at other highly visible locations, such as corners and gates, the following signs are located on the fence facing outward:

US ARMY
RESTRICTED AREA
WARNING

This area has been declared a Restricted Area by authority of the Commanding Officer, in accordance with provisions of the Directive issued by the Secretary of Defense on 20 August 1954, pursuant to the provisions of Section 21, Internal Security Act of 1950. Unauthorized entry is prohibited. All persons and vehicles entering hereon are liable to search. Photographing, making notes, drawings, maps, or graphic representations of this area or test activities, are prohibited unless specifically authorized by the Commanding Officer. Any such material found in the possession of unauthorized persons will be confiscated.

In addition, information signs warning against smoking and the introduction of matches and other flame-producing devices are displayed at all normally used gates.

II.G.6 Entry to Regulated Units

Entry to the regulated units is controlled via personnel monitoring, video surveillance, and displayed signage. All personnel entering the area must check in with the control room prior to entry to the incinerator. A visitors log is maintained of those personnel that are not normally assigned to the area. This access is further restricted when waste is being burned or grinding is being conducted. No one is allowed within 50 feet of an incinerator when it is treating waste. No one is allowed in the area during grinding operations.

Signs and flashing red lights provide visible indication of the hazards of the area and serve to limit entry. Operation of each area (the grinder and each incinerator) is indicated with a flashing red light. The area is posted with signs stating “NO ENTRANCE WHILE THE RED LIGHT IS FLASHING”. Finally, there is a sign posted at the roadway entrance to the grinder and incinerator facilities with the approved legend “DANGER UNAUTHORIZED PERSONNEL KEEP OUT”. Signs with this legend are also placed at the Grinder Building and at each of the two incinerators. All warning signs posted around the regulated units can be read from a distance of at least 25 feet.

Attachment II.Ga - Security Provisions and Maintenance for the EWI-CWP Complex

II.Ga.1. Introduction

Protection of plant personnel, property, resources and operations at the RFAAP, a Government-owned, contractor-operated (GOCO) manufacturing facility, is provided by the operating contractor or subcontractor in accordance with Department of the Defense (DOD), Department of the Army (DA), United States Army Joint Munitions Command (USAJMC) and other regulatory guidance and standards. Generally, a subcontractor security guard force is used to perform and enforce prescribed physical security measures.

II.Ga.2. Security Procedures and Equipment

The RFAAP is a protected military installation, under 24-hour surveillance from a trained security force. RFAAP is considered a “closed post” in that access is controlled at all times by perimeter barriers with limited, manned entry control points. The secured areas of the installation have been designated as Limited and Posted Areas. More than 70 percent of the RFAAP’s acreage is enclosed in three limited areas. All propellant manufacturing, storage, testing and support activities, except for administration, are included in limited areas. Those areas outside of the limited area but within the posted area are restricted to non-energetic activities.

Physical security measures at RFAAP include security guard patrols, manned security posts, perimeter fencing, a badge identification system, lock and key accountability and rotation, vehicle registration, pre-employment background investigations, security lighting, warning signs and physical barriers.

II.Ga.3. 24-Hour Security System

The security guard force provides 24-hour, 7 day a week security coverage of the RFAAP, performing various security duties across the installation as required to protect the installation and the operations performed therein. Documentation of the security procedures followed is maintained on-site and is available for inspection upon request by DEQ.

II.Ga.4. Barrier and Means to Control Entry

Entry to the RFAAP is restricted 24 hours per day, 7 days a week to authorized personnel. Personnel must be in possession of a valid personnel identification badge or visitor badge. If the person has valid official business at the plant or is accompanying a person who does have such business, posted area visitor badges are issued and the time and date of entry is recorded.

The EWI-CWP complex is located within the limited area of the plant. Access to this area is strictly controlled through manned security gates that perform an identification check of each person entering the area. Only those persons with valid contractor, government, or visitor identification badges are permitted. At the EWI-CWP complex itself, each person going to the complex must notify the control room and obtain permission. Vehicle entry into the actual operating area is controlled by automatic, card-access controlled gates that span the entire paved section of the roadway. Video surveillance of the area is also provided throughout the complex. These security cameras provide the control room continuous, visual indication of all vehicle and foot traffic into, out of, and within the operating areas of the complex. In addition, access into each building managing hazardous waste (*i.e.*, Grinder Building, Loading Building) is controlled via a common-access card reader system and video surveillance systems within each building.

Protection of sensitive and critical information about the RFAAP and its operations is important to the successful achievement of the RFAAP mission. If adversaries (terrorists, criminals, foreign intelligence organizations or governments, etc.) can gain information about RFAAP, correctly analyze it, and act upon it, the compromise of this information could prevent or seriously degrade mission success. The National Operations Security (OPSEC) Program, which is outlined in National Security Decision Directive 298 (NSDD 298), requires each executive department and agency with a national security mission to have an OPSEC program. Likewise, Department of Defense (DOD) Directive 5205.02E, DOD Operations Security Program, supports the national program and is the basis for the Department of the Army's implementing guidance and policy, Army Regulation 530-1, Operations Security. As a result of these OPSEC and DOD concerns and requirements, further details concerning the security and means to control entry at the RFAAP are withheld from this Permit. Information necessary to demonstrate compliance with 40 CFR §264.14(b)(2)(ii) is maintained onsite and is available for review and inspection by authorized individuals as necessary.

II.Ga.5. Warning Signs

At all plant entrances and in areas designated as posted, the following “Condition to Entry” signs have been erected:

CONDITION OF ENTRY
TO
RADFORD ARMY AMMUNITION PLANT

All persons, their possessions and vehicles are liable to search upon entering, during their stay, or upon their leaving this installation. Entry of persons and/or vehicles constitutes consent to search by proper authorities at any time.

The following articles are prohibited on this installation:

- Firearms, Ammunition and Weapons
- Explosives and Explosives Devices
- Cameras
- Intoxicants and Drugs
- Gambling Devices
- Chemical Emission Devices
- Stolen Property and Obscene Literature

By Order of the Commanding Officer

Signs reading "US Government Property - No Trespassing" are located approximately every 500 feet on the installation boundary, except where designated limited area fences are not located on or are reasonably adjacent to the property boundary.

Every 500 feet on limited area fences and at other highly visible locations, such as corners and gates, the following signs are located on the fence facing outward:

US ARMY RESTRICTED AREA
WARNING

This area has been declared a Restricted Area by authority of the Commanding Officer, in accordance with provisions of the Directive issued by the Secretary of Defense on 20 August 1954, pursuant to the provisions of Section 21, Internal Security Act of 1950. Unauthorized entry is prohibited. All persons and vehicles entering hereon are liable to search. Photographing, making notes, drawings, maps, or graphic representations of this area or test activities, are prohibited unless specifically authorized by the Commanding Officer. Any such material found in the possession of unauthorized persons will be confiscated.

In addition, information signs warning against smoking and the introduction of matches and other flame-producing devices are displayed at all normally used gates.

II.Ga.6. Entry to Regulated Units

Entry to the regulated units is controlled via controlled vehicle entry gates, personnel monitoring, and video surveillance as described above in II.Ga.4. In addition, signage is provided throughout the complex indicating that entry to the area is restricted. All warning signage can be read from a distance of at least 25 feet.

All personnel entering the area must check in with the control room prior to entry to the operating portion of the complex and vehicles must pass through controlled gates. A visitors log is maintained of those personnel that are not normally assigned to the area. This access is further restricted when waste is being burned or grinding is being conducted. No one is allowed in the area during grinding operations. When waste is being burned, personnel access is restricted outside of designated explosive arcs. Cross-over points for each of these arcs are designated with a red flashing light and signage.

Access to each operating building is further restricted with common-access card control systems. Signage is provided on each building that reads as follows:

THIS FACILITY IS PROTECTED BY AN ALARM SYSTEM Unauthorized entry is prohibited. Violators will be prosecuted under the provisions of the UCMJ or other applicable laws.

Specific hazardous waste storage areas are provided with the following signage.

Attachment II.H - Flood Proofing/Protection Plans and Specifications and 100-Year Flood Response Procedures

II.H.1 Floodplain Standard

Figure II.H-1 provides a depiction of the 100-year flood plain elevations near the permitted storage and treatment area. This data was obtained from a combination of sources. The National Flood Insurance Program, Flood Insurance Rate Map dated November 7, 2011, was used to obtain information on 100-year flood elevations in the area near the incinerator. This data was then combined with more detailed topographic contour data from a 1992 contour analysis of the RFAAP to provide a more accurate representation of flood tendencies within the permitted storage and treatment area.

II.H.2 Demonstration of Compliance

As shown in the figure, the foundation of Building 442, which houses the slurry tanks, and Buildings 440 and 441, which represent the incinerators, are located within the 100-year floodplain. However, the operating floors of the buildings are above the 100-year flood plain elevation. Therefore, while the building foundations may be wetted from a 100-year flood, the portions of those buildings holding hazardous waste (the slurry tanks and the incineration chambers) are above the 100-year flood elevation. Therefore, the waste itself is not at risk from a flood. The 100-year flood elevation is 1700 ft. MSL at the incinerators. The lowest entry point to the main operating floor, which stores hazardous waste at Building 442, is 1,702.13 ft. MSL. The incinerator kilns and afterburners are above 1700 ft. MSL, with the lowest point being the kiln outlet on Incinerator 440 at 1,704.75 ft. MSL. Given the proximity of the structures to the 100-year flood elevation, however, RFAAP has instituted the flood proofing and protection plans described herein.

II.H.3 Flood Proofing and Flood Protection Measures

Located between the New River and the permitted waste storage and treatment facility are some of RFAAP's railroad lines. These railroad lines are elevated and would serve as a barrier to prevent flooding of the area except that culverts (transverse drains) have been built through the railroad embankment. The culverts have been constructed to drain water from the area surrounding the facilities. During a 100-year flood however, the flood waters will flow in the opposite direction through the culverts and toward the facilities. If facility personnel were to block the entrances to these culverts in the event of an anticipated 100-year flood occurrence, water would not be expected in the permitted treatment and storage area. This preventative action is the most desirable flood protection measure. In the case that the culverts are not adequately blocked during a 100-

year flood and flooding is imminent, the procedures described below will be followed.

II.H.4 Plant-Wide Flood Plan

A plant-wide flood plan has been developed for the site in the event that flooding conditions at RFAAP are imminent. Included in the plan are safety precautions, flood watch procedures, reporting, flood levels and buildings affected by high waters, as summarized below.

Utilities personnel are responsible for monitoring the river elevations at the River Bridge. When flooding appears imminent, readings are taken at the River Bridge at a minimum of once per hour. At an elevation of 1,695 feet at the River Bridge (five feet below flood stage at the bridge), or if conditions warrant, a Utilities Division representative shall collect information from local sources to help evaluate the flooding potential. This information will be updated hourly provided the river level is rising and/or is in flood stage.

The time the flood waters will take to reach the facility varies depending on the amount of discharge at Claytor Dam. It is estimated that a flood crest starting at Claytor Dam will reach the facility in approximately 2 to 3 hours.

Utilities personnel shall request the Security Police Dispatcher to notify key personnel in the instance of the following events:

- The Claytor Lake dam gates are opened 20 feet or more;
- The water level reaches an elevation of 1,697 feet at the River Bridge; or
- Flooding conditions are predicted.

The Environmental Department shall coordinate any corrective action and cleanup activities that are necessary. Engineering is responsible for estimating damages to physical facilities and equipment.

II.H.5 Flood Plan for the Permitted Storage and Treatment Area

In the event that the New River height at the River Bridge reaches 1,695 ft MSL (five feet below flood stage at the bridge), RFAAP will institute the flood protection plan for the permitted storage and treatment areas. When this plan is activated, RFAAP will take action to prevent harm to human health and the environment due to the washout of the hazardous waste management area. The information below provides a summary of the actions that will be taken. Each of the below tasks will be prioritized based on the rate of rise in the river levels and other factors. However, the utmost priority in a flooding situation will remain the safety of personnel working in the area. Should conditions become dangerous for personnel, any or all of the procedures detailed below may be abandoned, an emergency shutdown will be performed, and the area will be evacuated.

Provided that an immediate evacuation of the area is not warranted, any containerized waste that has not been ground and slurried will be returned to the facility hazardous waste accumulation area, which is above the 100-year flood elevation. Any waste already slurried and in the slurry tanks will be incinerated if possible before the river reaches the 100-year flood level. (Note the burnout times listed in Table II.H-1). This measure will help alleviate any inspection requirements during the flood period. However, if the tanks cannot be fully emptied due to unit outages or other problems, the slurry will be left to remain in them, as the lowest entry point to the Grinder Building is above the 100-year flood elevation and washout is not likely.

Once all waste that can be incinerated has been, the incinerators will be shutdown. All hazardous waste combustion ash residue maintained in the less than 90-day accumulation area adjacent to the incinerators will be removed from the area to an appropriate storage building outside that region threatened by the flood waters.

If ample time is still available following completion of the above activities, the kiln dam debris and evaporative cooler hoppers will also be emptied and those contents moved along with the other ash residue. There are no compatibility restrictions on the incinerator ash and the untreated propellant at the accumulation area. The procedures and equipment used to move the ash are similar to those for moving the waste propellant containers.

If time allows, the contents of the make-up water pit will then be pumped to the tanker and all visible solid propellant will be removed from the catch tank screens. The filled tanker will then be moved to the Finishing Area, which is above flood stage. (Note that the make-up water is not considered a hazardous waste).

Prior to evacuating the area, sand bags will be placed at the culverts between the river and the incinerator area. All electronics will be secured and paper files removed if possible. Finally, the natural gas supply to the area will be valved-off, and area management will direct evacuation of the area.

Table II.H-1 lists the locations, activities and timing involved in removing the waste from the area in the event of flooding. In general, ample time exists between flood notification and the arrival of flood waters at the facility to implement the flood plan activities. As shown in Table II.H-1, the time required to move the wastes from Building 442 is an hour for the solid wastes and three to six hours to treat one tank of aqueous slurry, depending on whether one or two incinerators are in operation. These activities can be performed simultaneously, as there are an adequate number of trained waste incinerator area personnel to independently accomplish the tasks.

II.H.6 Waiver for Land Storage and Disposal Facilities

The incinerators are not land storage or disposal facilities. Therefore, a waiver from the floodplain standard is not applicable to this permit application.

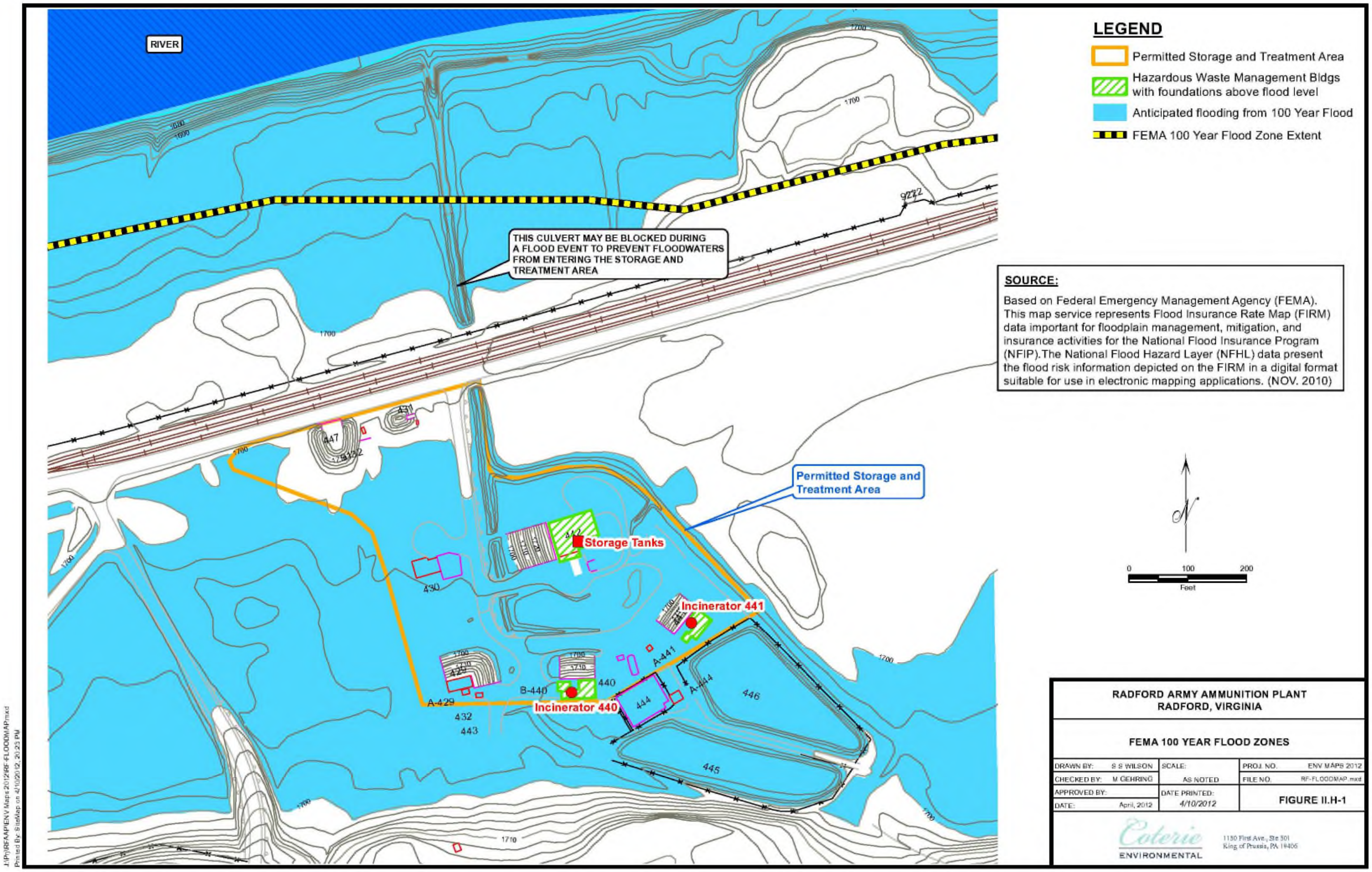
II.H.7 Plan for Future Compliance with Floodplain Standard

The incinerators' foundations currently lie within the 100-year floodplain. Plans have not been initiated for their removal or alteration. RFAAP has procedures in place for advanced warning and notification in the event of flooding of the New River that provides adequate protection for the hazardous wastes managed in these facilities. These procedures are documented herein and have been demonstrated effective in protecting the permitted storage and treatment area from washout on numerous occasions.

TABLE II.H-1 - REMOVING WASTE IN THE EVENT OF FLOODING

Type of Waste Material	Location to which waste will be moved	Procedures and equipment to be used	Personnel to be Used	Time required for waste movement
Solid waste propellant in containers	Facility Hazardous Waste Accumulation Area	Move wastes to the Explosive Hold House per standard procedures using powder vans	Trained storage and treatment area personnel	Loading: 25 minutes (max, 36 cans) Transport: 10 minutes (3300 feet) Unloading: 25 minutes Total: 60 minutes
Slurried waste propellant in tank(s)	Incinerator or Facility Hazardous Waste Accumulation Area	Incinerate wastes following standard operating procedures if time allows	Trained storage and treatment area personnel	Incineration Two incinerators: 2½ - 3 hours per slurry tank One incinerator: 5 – 6 hrs per slurry tank
Incinerator ash	Facility Hazardous Waste Accumulation Area	Transport waste to accumulation area using powder vans following standard procedures	Trained storage and treatment area personnel	Approximately 2 hrs
Empty make-up pit and transfer tanker	Finishing Area	Tractor and liquid tanker from Finishing Area	Trained storage and treatment area personnel and Class A CDL driver	Loading: 30-45 minutes Transport: 15 minutes to 2 hours, dependent on CDL driver availability

Figure II.H-1 – Flood Map



Attachment II.Ha - Flood Proofing and Protection Plan

II.Ha.1. Floodplain Standard

Figure II.Ha-1 provides a depiction of the 100-year flood plain elevations near the EWI-CWP complex. This data was obtained from a combination of sources. The National Flood Insurance Program, Flood Insurance Rate Map for Pulaski County dated September 26, 2008, was used to obtain information on 100-year flood elevations in the area near the EWI-CWP complex. This data was then combined with more detailed topographic contour data from a 1992 contour analysis of the RFAAP to provide a more accurate representation of flood tendencies within the EWI-CWP complex.

II.Ha.2. Demonstration of Compliance

As shown in the figure, site design for the EWI-CWP complex is based on placing all facilities a minimum of 12 inches above the base flood elevation (BFE), with the base foundation of all hazardous waste management equipment in the new EWI-CWP complex above the 100-year floodplain. The 100-year flood elevation at the site is 1,704 ft mean sea level (MSL). All equipment in the complex is being sited at grades of 1,705 ft MSL and above. The base elevation of each hazardous waste management unit is provided in Table II.Ha-1. Pursuant to 40 CFR §§270.14(b)(11)(iii) and 264.18(b), with the equipment being located outside of the 100-year floodplain, no further information or demonstration is required on flood proofing and protection for the EWI-CWP complex.

Figure II.Ha-1 - Flood Map

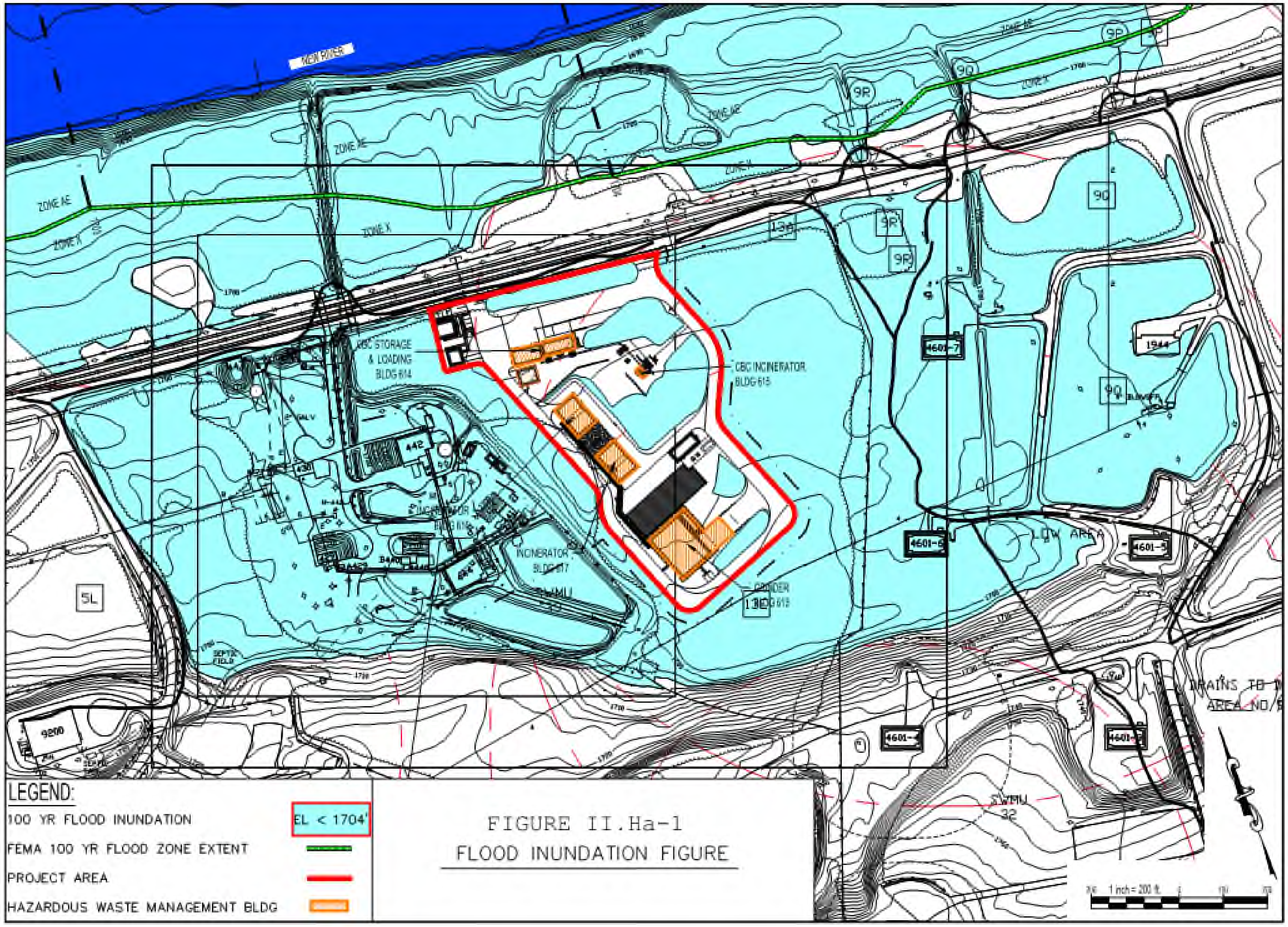


Table II.Ha-1 - Hazardous Waste Management Unit Base Elevations

Unit No.	Description	Elevation (ft MSL)	
		Foundation at Grade	Point of Entry
613	Grinder Building	1,705.5	1,705.5
614	Car Bottom and CBC Loading Building	1,705.5	1,705.5
615	CBC Unit	1,705.5	1,705.5
616	Kiln #1	1,705	1,705.5
617	Kiln #2	1,705	1,705.5
619	Central Accumulation Area	1,705.5	1,705.25

Module III - Operating Conditions for the EWI and EWI-CWP

III.A. GENERAL - EWI

This Module is organized with separate Parts to identify the operational and performance requirements that are specific to each type of unit (i.e., tanks, incinerators, etc.).

- Section III.B provides requirements for equipment subject to the air emission control requirements of 40 CFR Part 264, Subpart BB;
- Section III.C provides requirements for air emission controls for the permitted tanks pursuant to 40 CFR Part 264, Subpart CC;
- Module IV addresses specific requirements for storage and treatment in the permitted tank systems; and
- Module V addresses specific requirements for the hazardous waste incinerators.

III.Aa GENERAL – EWI-CWP

This Module is organized with separate Parts to identify the operational and performance requirements that are specific to each type of unit (i.e., tanks, incinerators, etc.) included in the EWI-CWP Complex. The module is organized as follows:

- Section III.Ba provides requirements for equipment subject to the air emission control requirements of 40 CFR Part 264, Subpart BB;
- Section III.Ca provides requirements for air emission controls for the permitted tanks pursuant to 40 CFR Part 264, Subpart CC;
- Module IV addresses specific requirements for storage and treatment in the permitted tank systems; and
- Module V addresses specific requirements for the hazardous waste incinerators.

III.B. ORGANIC AIR EMISSION REQUIREMENTS FOR EQUIPMENT LEAKS – EWI

III.B.1. Highlights

The equipment subject to the 40 CFR 264, Subpart BB is that equipment that contains or contacts hazardous waste organic concentration of at least 10% by weight. The subject equipment, listed in Attachment III.A, Table I are listed by equipment I.D. number, associated hazardous waste management unit, type of equipment, and location. A facility plot map (see Attachment III.A, Figure 1) shows the general area within which the subject equipment is located. The subject equipment comes into contact with the waste slurry, a light liquid, before it is fed to the rotary kiln incinerators. This equipment includes various pumps, valves, and miscellaneous connections, each of which is marked in a manner such that they can be readily distinguished from other equipment. There are no compressors, pressure relief devices, sampling connecting systems, or open-ended valves or lines that contact or contain such waste.

The maximum possible organic concentration of the waste that this equipment contacts or contains was determined from the maximum organic concentration (100%) of any propellant generated at the RFAAP Facility. Before being burned in the incinerator, all propellants are ground into a slurry that is, at a minimum, 3.5 parts water for every part propellant. Based on this specification, the maximum possible organic concentration (attributable to solid propellant) that the equipment listed in Attachment III.A, Table I could contain or contact would be 22%. This is the basis used for the organic concentration of <30% listed in Attachment III.A, Table I.

III.B.2. Permitted and Prohibited Waste Identification

a. The Permittee may manage the wastes listed in Appendix II.B-1, Table I (see Module II, Attachment II.B) with the equipment listed in Attachment III.A, Table I subject to the terms of this Permit.

b. The Permittee is prohibited from managing hazardous waste that is not identified in Permit Condition III.B.2.a. with the equipment listed in Attachment III.A, Table I.

III.B.3. Emission Control Technology

The Permittee shall operate and maintain equipment and associated emission control technology according to detailed plans and reports contained in Attachment III.A, and Parts III.1 and III.2. of this Permit.

III.B.4. Monitoring and Inspection Schedules and Procedures

a. Valves

The following valves shall be monitored monthly using Reference Method 21, and must maintain a reading of less than 10,000 ppm as specified in Attachment III.A. Any valve for which a leak is not detected for two successive months may be monitored quarterly until a leak is detected. If a leak is detected, the Permittee must resume monitoring the valve monthly until a leak is not detected for two successive months. All leaks must be repaired in compliance no later than 15 calendar days after leak detection, and a first attempt at repair must be made no later than 5 calendar days after leak detection.

Valve I.D. No.	HW Mgmt. Unit	Location
V-A-440	Incinerator 440	440 Pump House
V-B-440	Incinerator 440	440 Pump House
V-A-441	Incinerator 441	441 Pump House
V-B-441	Incinerator 441	441 Pump House
V-14	Tank T-1A	Grinder Bldg, 442
V-15	Tank T-1B	Grinder Bldg, 442
V-17A	Tank T-1A	Grinder Bldg, 442
V-17B	Tank T-1B	Grinder Bldg, 442
V-18A	Tank T-1A	Grinder Bldg, 442
V-18B	Tank T-1B	Grinder Bldg, 442
V-27A	Tank T-1A	Grinder Bldg, 442
V-27B	Tank T-1B	Grinder Bldg, 442

b. The following valves are designated difficult to monitor and shall be monitored annually as specified in Attachment III.A.

Valve I.D. No.	HW Mgmt. Unit	Location
V-440S	Incinerator 440	Slurry Loop
V-440R	Incinerator 440	Slurry Loop
V-441S	Incinerator 441	Slurry Loop
V-441R	Incinerator 441	Slurry Loop

c. Pumps

The following pumps shall be visually inspected weekly and monitored monthly using Reference Method 21 and must maintain a reading less than

10,000 ppm and must comply with the leak repair program as specified in Attachment III.A.

Pump I.D. No.	HW Mgmt. Unit	Location
P-1A	Tank T-1A	Grinder Bldg, 442
P-1B	Tank T-1B	Grinder Bldg, 442
P-440	Incinerator 440	440 Pump House
P-441	Incinerator 441	441 Pump House

d. Flanges and Other Connectors

The following flanges and other connectors shall be monitored within 5 days using Reference Method 21 (and must maintain a reading of less than 10,000 ppm) if evidence of a leak is found by visual, audible, olfactory, or any other detection method, and must comply with the leak repair program as specified in Attachment III.A.

Flange or Connector I.D. No.	HW Mgmt. Unit	Location
Tee-1A, flanged connection	Tank T-1A	Grinder Bldg, 442
Tee-1B, flanged connection	Tank T-1B	Grinder Bldg, 442
SG-1, flanged connection	Incinerator 440/441	Grinder Bldg, 442
PIT-1, screwed connection	Incinerator 440/441	Grinder Bldg, 442
PIT-2, screwed connection	Incinerator 440/441	Grinder Bldg, 442
Tee-A-440, flanged connection	Incinerator 440	440 Pump House
Tee-B-440, flanged connection	Incinerator 440	440 Pump House
Tee-C-440, flanged connection	Incinerator 440	440 Pump House
Tee-D-440, flanged connection	Incinerator 440	440 Pump House
Tee-A-441, flanged connection	Incinerator 441	441 Pump House
Tee-B-441, flanged connection	Incinerator 441	441 Pump House
Tee-C-441, flanged connection	Incinerator 441	441 Pump House
Tee-D-441, flanged connection	Incinerator 441	441 Pump House
Adp-A-440, hose adapter connection	Incinerator 440	440 Pump House
Adp-B-440, hose adapter connection	Incinerator 440	440 Pump House
Adp-C-440, hose adapter connection	Incinerator 440	440 Pump House

Flange or Connector I.D. No.	HW Mgmt. Unit	Location
Adp-D-440, hose adapter connection	Incinerator 440	440 Pump House
Adp-E-440, hose adapter connection	Incinerator 440	440 Pump House
Adp-F-440, hose adapter connection	Incinerator 440	440 Pump House
Adp-G-440, hose adapter connection	Incinerator 440	440 Pump House
Adp-H-440, hose adapter connection	Incinerator 440	440 Pump House
Adp-A-441, hose adapter connection	Incinerator 441	441 Pump House
Adp-B-441, hose adapter connection	Incinerator 441	441 Pump House
Adp-C-441, hose adapter connection	Incinerator 441	441 Pump House
Adp-D-441, hose adapter connection	Incinerator 441	441 Pump House
Adp-E-441, hose adapter connection	Incinerator 441	441 Pump House
Adp-F-441, hose adapter connection	Incinerator 441	441 Pump House
Adp-G-441, hose adapter connection	Incinerator 441	441 Pump House
Adp-H-441, hose adapter connection	Incinerator 441	441 Pump House
Ell-A-440, flanged connection	Incinerator 440	440 Pump House
Ell-B-440, flanged connection	Incinerator 440	440 Pump House
Ell-A-441, flanged connection	Incinerator 441	441 Pump House
Ell-B-441, flanged connection	Incinerator 441	441 Pump House

III.B.5. Recordkeeping and Reporting

a. The Permittee shall keep on file the following equipment information: listing of an identification number for each piece of equipment that contains or contacts hazardous wastes with organic concentration of at least 10% by weight; the respective hazardous waste management unit identification; each piece of equipment's specific location at the facility; and the type of equipment; the hazardous waste state at the equipment; and the method of compliance with the standard.

b. The Permittee shall identify each piece of leaking equipment and provide required recordkeeping as provided in 40 CFR § 264.1064(d).

c. The Permittee shall comply with the information requirements for equipment subject to 40 CFR §§ 264.1052 through 264.1060.

d. The Permittee shall keep on file information used in determining exemptions.

e. The Permittee shall report semi-annually to the Department the information on valve and pump leaks that were not repaired in accordance with requirements, and the dates of hazardous waste management unit shutdowns

III.B.6. Tenant Waste

RFAAP may accept tenant wastes for accumulation in a RFAAP less than 90-day accumulation area. All wastes from RFAAP tenant organizations must be treated or transferred to a permitted hazardous waste storage tank within 90-days from the point of generation by the RFAAP tenant organization.

III.Ba ORGANIC AIR EMISSION REQUIREMENTS FOR EQUIPMENT LEAKS – EWI-CWP

III.Ba.1. Highlights

The equipment subject to the 40 CFR Part 264, Subpart BB is that equipment that contains or contacts hazardous waste organic concentration of at least 10% by weight. The subject equipment is identified in Attachment III.Aa, Table III.Aa-1. Information is provided on the equipment identification number, the associated hazardous waste management unit, the type of equipment, and the approximate location. The subject equipment comes into contact with the waste slurry, a light liquid, before it is fed to the rotary kiln incinerators. This equipment includes various pumps, valves, and miscellaneous connections, each of which will be marked in a manner such that it be readily distinguished from other equipment. There are no compressors, sampling connection systems, or open-ended valves or lines that contact or contain such waste.

The maximum possible organic concentration of the waste that this equipment contacts or contains was determined from the maximum organic concentration (100%) of any energetic material generated at the RFAAP. Before being burned in the incinerators, all energetic material is ground into a slurry. All grinding occurs at a ratio of 10 parts water for every one part propellant (10:1). At this point, the maximum organic concentration of the waste would be 9 percent by weight. After being ground and placed into a slurry tank, excess water is decanted off and the ratio of water to propellant is reduced to 3:1. At this point, the maximum possible organic concentration of the waste is 25%. Using these ratios, all equipment between the grinder tanks and the slurry tanks is assumed to contain waste with a maximum organic concentration of 9 percent by weight, and all equipment between the slurry tanks and the kilns, including the entire slurry loop, is assumed to contain waste with a maximum organic concentration of 25 percent by weight. The 10:1 slurry is considered a heavy liquid, and the 3:1 slurry is considered a light liquid.

III.Ba.2. Permitted and Prohibited Waste Identification

a. The Permittee may manage the wastes listed in Module II, Attachment II.Ba with the equipment listed in Attachment III.Aa, subject to the terms of this Permit.

b. The Permittee is prohibited from managing hazardous waste that is not identified in Permit Condition III.Ba.2.a. with the equipment listed in Attachment III.Aa, Table III.Aa-1.

III.Ba.3. Emission Control Technology

The Permittee shall operate and maintain equipment and associated emission control technology according to detailed plans and reports contained in Attachment III.Aa, and Modules IV and V of this Permit.

III.Ba.4. Monitoring and Inspection Schedules and Procedures

a. Pumps in Light Liquid Services

The pumps that are in light liquid service are identified in Attachment III.Aa. Each of these pumps shall be visually inspected each calendar week and monitored monthly using Reference Method 21. Each pump must maintain a tight seal during each weekly inspection, with no visible liquids leaking from the seal, and must maintain a reading less than 10,000 ppm during each monthly inspection. All such pumps must comply with the leak repair program as specified in Attachment III.Aa.

In the event that one of the pumps specified in Attachment III.Aa is not processing slurry during a given month (*e.g.*, the associated incinerator is down for service), the monitoring specified above will be deferred and performed in the month when the unit returns to service.

b. Pressure Relief Devices in Gas/Vapor Service

The pressure relief devices identified in Attachment III.Aa are installed to control emissions from each of the permitted storage tanks. Each of these pressure relief devices shall be measured initially and within five days after a pressure release to verify that they are operating with no detectable emissions, as indicated by an instrument reading of 500 ppm or less above background and as measured using Reference Method 21.

c. Valves in Light Liquid Service

The valves that are in light liquid service are identified in Attachment III.Aa. Each of these valves shall be monitored monthly using Reference Method 21 and must maintain a reading of less than 10,000 ppm as specified in Attachment III.Aa. Any valve for which a leak is not detected for two consecutive months may be monitored quarterly until a leak is detected. If a leak is detected, the Permittee must resume monitoring the valve monthly until a leak is not detected for two consecutive months. All leaks must be repaired in compliance no later than 15 calendar days after leak detection, and a first attempt at repair must be made no later than 5 calendar days after leak detection.

In the event that one of the valves specified in Attachment III.Aa is not processing slurry during a given month (*e.g.*, the associated incinerator is down for service), the monitoring specified above will be deferred and performed in the month when the unit returns to service.

d. Pumps and Valves in Heavy Liquid Service

All of the pumps and valves in heavy liquid service (located in that section of line between the grinder tanks and the slurry tanks) will be visually inspected daily for signs of leaks. Any such pump or valve that is found via a visual, audible, olfactory, or other means to be leaking will be monitored within 5 days of discovery using Reference Method 21. The procedures specified in 40 CFR §264.1058 will be followed if an instrument reading of 10,000 ppm or greater is found.

e. Flanges and Other Connectors

The flanges and other connectors identified in Attachment III.Aa shall be monitored within 5 days using Reference Method 21 (and must maintain a reading of less than 10,000 ppm) if evidence of a leak is found by visual, audible, olfactory, or any other detection method and must comply with the leak repair program as specified in Attachment III.Aa.

III.Ba.5. Recordkeeping and Reporting

a. The Permittee shall keep on file the following equipment information as required by 40 CFR §§264.1052 through 264.1060: listing of an identification number for each piece of equipment that contains or contacts hazardous wastes with an organic concentration of at least 10% by weight; the respective hazardous waste management unit identification; each piece of equipment's specific location at the facility; the type of equipment; the hazardous waste state and percent-by-weight total organics in the waste stream at the equipment; and the method of compliance with the standard.

b. The Permittee shall identify each piece of leaking equipment and provide required recordkeeping as provided in 40 CFR §264.1064(d).

c. The Permittee shall keep on file information used in determining exemptions pursuant to 40 CFR §§264.1060 and 1064(k).

d. The Permittee shall report semi-annually to the Department the information on leaks that were not repaired in accordance with requirements, and the dates of hazardous waste management unit shutdowns.

III.C. ORGANIC AIR EMISSION REQUIREMENTS FOR TANKS AND CONTAINERS - EWI

III.C.1. Applicability

a. Subpart CC applies to all tanks and containers identified in this Permit except as provided for in 40 CFR §§ 264.1 and 264.1080(b).

b. Permit Condition III.C., applies to hazardous waste management units identified below, for which required control equipment has been installed and is operational or are exempt from Subpart CC standards under 40 CFR § 264.1082(c):

Unit Designation	Unit Type	Description of Air Emission Control System
T-1A and T-1B	tanks	Permanent total enclosure [40 CFR 264.1082(c)(5)(iii)]
Trolley conveyor containers	container	Design capacity ≤ $0.1m^3$ [40 CFR 264.1080(b)(2)]
HW accumulation containers	container	Design capacity ≤ $0.1m^3$ [40 CFR 264.1080(b)(2)]

III.C.2. Emission Control Technology

a. The Permittee shall maintain all regulated units and associated emission control technology in accordance with Permit Condition III.C.2. and the detailed plans, schedules, information, and reports as contained in Attachments III.1.A, III.1.B, and III.1.C.

b. The Permittee has elected to control hazardous waste organic air emissions in accordance with Permit Condition III.C. and 40 CFR 264, Subpart CC by demonstrating that the enclosure within which Tanks T-1A and T-1B are housed (Grinder Bldg, 442) is designed and operated in accordance with the criteria for permanent total enclosure as specified in "Procedure T – Criteria for and Verification of a Permanent or Temporary Total Enclosure" under 40 CFR 52.471, Appendix B.

c. The Permittee shall perform the verification procedure for the enclosure (Grinder Bldg, 442) as specified in Section 5.0 to "Procedure T – Criteria for and Verification of a Permanent or Temporary Total Enclosure" (see 40 CFR § 52.741, Appendix B) annually.

d. Pursuant to Permit Condition III.C.2.b. and Attachment III.B, all doors and vents of the Grinder Building, 442 must remain closed whenever the grinder is in operation or there is waste in Tanks T-1A or T-1B, except to allow worker access or passage of material, wastes, or equipment into or out of the enclosure.

e. The Permittee shall submit to the Department an annual verification pursuant to Permit Conditions III.C.2.c. and III.C.3.

f. Pursuant to 40 CFR 270.32 (b)(2), VOC emissions that have been captured from the Grinder Bldg, 442 shall not be discharged through a control device.

g. If for any reason the Grinder Bldg, 442 is not verified as a permanent total enclosure pursuant to Permit Conditions III.C.2.c., III.C.2.e., and III.C.3., the Permittee shall cease operation of Tanks T-1A and T-1B until organic air emissions controls in accordance with 40 CFR 264, Subpart CC, as applicable, are provided.

<u>III.C.3.</u> <u>Reporting Requirements</u>

a. For each tank or container which manages hazardous waste that is exempted from using air emission controls, a written report shall be submitted to the Department within fifteen (15) days of each occurrence when hazardous waste is placed in the waste management unit in noncompliance with the conditions of 40 CFR §§ 264.1082(c)(1) or (c)(2), as applicable. The written report shall contain the EPA I.D. number, facility name and address, a description of the noncompliance event and the cause, the dates of the noncompliance, and the actions taken to correct the noncompliance and prevent reoccurrence of the noncompliance.

b. By March 31 of each year, the Permittee shall submit to the Department the annual verification of the permanent total enclosure pursuant to Permit Conditions III.C.2.c. and III.C.2.e.

c. Pursuant to 40 CFR § 270.32 (b)(2), the Permittee shall maintain in the facility operating record all documentation concerning the feasibility of discharging captured VOC emissions from the Grinder Bldg, 442 to a control device.

d. Pursuant to 40 CFR § 270.32 (b)(2), the Permittee shall submit to the Department for review a report that meets the requirements of Attachment III.C every 3 years from the effective date of this permit.

e. All reports shall be signed and dated by an authorized representative of the Permittee in accordance with Permit Condition I.I.3. (see Module I).

III.C.4. Notification of New Units

Prior to installing any tank, surface impoundment, container, or miscellaneous unit subject to 40 CFR 264, Subpart CC, the Permittee shall apply for a permit modification in accordance with Permit Condition I.B.2. (see Module I) and provide specific Part B information required under 40 CFR § 270.27, as applicable.

III.Ca ORGANIC AIR EMISSION REQUIREMENTS FOR TANKS AND CONTAINERS – EWI-CWP

III.Ca.1. Applicability

a. 40 CFR Part 264, Subpart CC applies to all tanks and containers identified in this Permit except as provided for in 40 CFR §§ 264.1 and 264.1080(b).

b. Permit Condition III.Ca., applies to the hazardous waste management units identified below, for which required control equipment has been installed and is operational or which are exempt from Subpart CC standards under 40 CFR § 264.1082(c):

Unit Description	ID No.	Unit Type	Description of Air Emission Control
Kiln slurry tanks	613-T-30079 613-T-30197 613-T-30164	Tank	Conservation vent

Unit Description	ID No.	Unit Type	Description of Air Emission Control
Grinder tanks	613-T-30103 613-T-30131	Tank	Conservation vent
Makeup water tank	613-T-30015	Tank	Conservation vent
Decant water tank	613-R-30028	Tank	Conservation vent
Waste conveyor containers	N/A	Container	Design capacity ≤ 0.1m^3 [40 CFR §264.1080(b)(2)]
Hazardous waste accumulation containers	N/A	Container	Design capacity ≤ 0.1m^3 [40 CFR §264.1080(b)(2)]

III.Ca.2. Emission Control Technology

a. The Permittee shall maintain all regulated units and their associated emission control technology in accordance with Permit Condition III.Ca.2. and the detailed plans, schedules, and information as contained in Attachments III.Aa and III.Ba.

b. The Permittee has elected to control hazardous waste organic air emissions in accordance with Permit Condition III.Ca. and 40 CFR Part 264, Subpart CC by utilizing tanks with Level 1 controls (fixed roof tanks with conservation vents).

c. Each conservation vent on the permitted storage tanks is designed to remain closed at all times, except as permitted by 40 CFR §264(c)(3)(B)(ii) and as required to maintain the tank internal pressure in accordance with the tank design specifications. At all other times, the conservation vents are designed to operate with no detectable emissions. Information on the design, sizing, and specification of these vents is provided in Attachment III.Ba.

III.Ca.3. Reporting Requirements

a. For each tank or container that manages hazardous waste that is exempted from using air emission controls, a written report shall be submitted to the Department within fifteen (15) days of each occurrence when hazardous waste is placed in the waste management unit in noncompliance with the conditions of 40 CFR §§264.1082(c)(1) or (c)(2), as applicable. The written report shall contain the EPA I.D. number, facility name and address, a description of the noncompliance event and the cause, the dates of the noncompliance, and the actions taken to correct the noncompliance and prevent reoccurrence of the noncompliance.

b. All reports prepared under this Permit shall be signed and dated by an authorized representative of the Permittee in accordance with Permit Condition I.I.3. (see Module I).

III.Ca.4. Notification of New Units

Prior to installing any tank, surface impoundment, container, or miscellaneous unit subject to 40 CFR Part 264, Subpart CC, the Permittee shall apply for a permit modification in accordance with Permit Condition I.B.2. (see Module I) and provide specific Part B information required under 40 CFR §270.27, as applicable.

III.D. ADDITIONAL INFORMATION - EWI

The Permittee has developed a series of *General Operating Procedures* (GOPs), *Unit Operating Procedures* (UOPs), and *Standing Operating Procedures* (SOPs) which provide additional operating details of the hazardous waste storage and treatment units. These various operating procedures deal with a wide variety of issues that affect all aspects of storage and treatment units.

For informational and completeness purposes, a tabulated list of all operating procedures relevant to any hazardous waste operations regulated by this Permit is provided in Table III-1. Requirements prescribed in the Permit Conditions (Modules I through VI) supersede the language of the operating procedures.

III.D.1. Revisions and Updates

The operating procedures are revised and updated by the Permittee on a periodic and/or as needed (e.g., implementation of a SOP reveals an inadequacy) basis.

a. All operating procedures revised or updated during the previous year shall be submitted to the Department by March 31 of each year, except as indicated in Permit Condition III.D.1.b.

b. Prior to implementation of any revision to an operating procedure that may result in a permit modification as specified in Appendix I to 40 CFR § 270.42, a request for a permit modification must be submitted to the Department for review and approval.

c. A request for a permit modification shall be submitted in accordance with Permit Condition I.B.2 (see Module I) along with the corresponding proposed revisions to operating procedures submitted in accordance with Permit Condition III.D.1.b.

d. Requests for the addition or removal of any operating procedures from Table III-1 shall be made in accordance with Permit Condition I.B.2. (see Module I).

e. The most current revisions of all operating procedures listed in Table III-1 shall be maintained in accordance with Permit Condition II.I.2. (see Module II).

III.D.2. Pre Treating Waste Rocket Motor Grains/Stick Propellants for Incineration

For reference, the terms grain or stick propellant are interchangeable and are derived from local or customer terminology rather than physical size or final product usage. These propellants can vary in size, as noted below, and in composition.

Propellant grains (herein referred to as grains) or stick propellants can be rejected and determined to be a hazardous waste throughout the production process; Grains/stick propellants that are to be treated via incineration must be sawed or cut to manageable lengths prior to being transported to the Grinder Building for treatment via incineration.

Once determined to be a hazardous waste, full-length grains/stick propellants are accumulated in dedicated waste buggies or tubs in a satellite accumulation area. Except for when adding or removing waste, the buggies and waste tubs will be covered with a tarp or lid pursuant to 40 CFR § 262.15 (a)(4).

A full buggy may contain up to 44 MK-90 grains. For reference, the average volume of the MK-90 rocket motor grain is 165 in^3 so a full 55-gallon drum (13,320 in^3) of waste would convert to approximately 80 MK-90 rocket motor grains. In general, volumes range from 0.16 in^3 to 617.21 in^3, converting to a range of approximately 83,250 to 21 grains/sticks of propellant per 55-gallon drum.

Once personnel are ready to remove the waste grains/stick propellants from the satellite accumulation area, the waste will be tagged and dated with an accumulation start date. The original accumulation start date for all waste will continue to be used for the waste until treated. This accumulation start date will not change through sawing/cutting operations or during/after management in subsequent less-than 90-day accumulation areas.

The waste grains/stick propellants will then be transported to a less-than-90-day accumulation area within three (3) calendar days. The waste will be retrieved from less than 90-day accumulation areas at varying frequencies for sawing/cutting. The waste will be returned to a less than 90-day accumulation area building immediately after sawing/cutting operations are completed or by the end of the shift if sawing/cutting operations have not been completed.

If possible, the waste grains/stick propellant may be transported directly to the saw/cutting operation from the satellite accumulation area, prior to the expiration of the three-day grace period. If this occurs, the grains/stick propellants (cut or full-length) will be placed into a less than 90-day accumulation area building subsequent to sawing/cutting operations. While the majority of the waste will be returned to the less-than 90-day accumulation area after being processed by the sawing/cutting operation, some waste may be returned full-length because of equipment failure or an emergency situation requiring evacuation of the sawing/cutting operation process area. At no time will the waste be taken out of a satellite accumulation area and placed back into a satellite accumulation area. The waste label will be marked to list each less-than 90 day accumulation area the buggy or tub has been transported to if it is moved between multiple less-than 90 day accumulation areas before being transported to the OBG or grinder building.

The waste grains/stick propellant will then be transported to the grinder building or OBG area, and will be incinerated, or open burned, at a minimum, prior to the expiration of the 90-day accumulation period.

In some instances, additional components are used for connection of grains/stick propellant to certain weapon systems. If the grains/stick propellants are rejected after the insertion of the component, the component must be removed, via the sawing/cutting operation described above. These components, with propellant attached, may be treated via open burning or disposed of at an approved off-site disposal facility within the allotted 90-day period. All sawing/cutting operations will be conducted per RFAAP standard operating procedures and in accordance with all safety precautions. Sawing is a shielded operation, thus personnel are not allowed in the saw bay while the saw is in operation. All building limits will be followed during these operations.

III.Da ADDITIONAL INFORMATION – EWI-CWP

The Permittee shall operate the hazardous waste storage and treatment units in a manner that will provide protection of human health and the environment. The Permittee shall develop written operating procedures that direct operators in safe and compliant operation of these units. These procedures shall be readily available for inspection and review at the RFAAP at the request of the Department.

TABLE III-1 - Operating Procedures

Procedure Type	Opn. No.	Area or Bldg No.	Procedure No.	Operation or Title
GOP		Plantwide	4-A-014	Cleaning/Decontamination of Contaminated Facilities Prior to Dismantling and Disposal by Alliant or Sub-Contractor
GOP			4-1-2B	Powder Van Operations
GOP		Propellant Areas	4-1-6	General Safety Rules – Propellant Department
UOP		Loading Operations	4-3-2H	Pickup and Transporting Waste Explosive Material to the Explosive Hold House and/or Grinder House
UOP		Loading Operations	4-12-28	Delivering and/or Receiving Propellants and.or Propellant Ingredients
GOP		NG-2 Area	4-15-53	Cleanup and Decontamination of NG/Nitrate Ester and Other Hazardous Spills
MOP		Maintenance	4-27-004(c)	Operation of the Decontamination Oven
SOP for Receiving and Storage	1	Designated Prod. Area Bldg.	RD-0000-L-001	Picking Up Propellant from Production Areas
SOP for Explosive Waste Incinerator	5	430, 4601-7	RD-0000-K-002	Transferring Waste from Storage Building to Grinder Building
SOP for Explosive Waste Incinerator	6	442, 447	RD-0000-K-002	Entering Grinder Building Slurry Pit Basement (Confined Space)
SOP for Explosive Waste Incinerator	7	442, 447	RD-0000-K-002	Preparing Grinder Building for Operation
SOP for Explosive Waste Incinerator	8	430, 442, 446, 4601-7	RD-0000-K-002	Loading the Trolley Conveyor
SOP for Explosive Waste Incinerator	9	442, 447	RD-0000-K-002	Grinding

Procedure Type	Opn. No.	Area or Bldg No.	Procedure No.	Operation or Title
SOP for Explosive Waste Incinerator	10	442, 447	RD-0000-K-002	Decanting Excess Water from Ground Material
SOP for Explosive Waste Incinerator	11	442, 447	RD-0000-K-002	Handling Metal Detector Trips
SOP for Explosive Waste Incinerator	12	442, 447	RD-0000-K-002	Handling a Plugged Grinder Screen
SOP for Explosive Waste Incinerator	13	442, 447	RD-0000-K-002	Handling a Grinder Malfunction During Operations
SOP for Explosive Waste Incinerator	14	442, 447	RD-0000-K-002	Handling a Malfunction in the Oversize Detector
SOP for Explosive Waste Incinerator	15	442	RD-0000-K-002	Adding Antifoam to Makeup Water and Slurry Tanks
SOP for Explosive Waste Incinerator	16	442, 447	RD-0000-K-002	Grinder Shutdown Due to Vibration
SOP for Explosive Waste Incinerator	17	442, 447	RD-0000-K-002	Unloading a Malfunctioning Trolley Conveyor
SOP for Explosive Waste Incinerator	18	442, 447	RD-0000-K-002	Changing the Slurry Tank Agitator Speed
SOP for Explosive Waste Incinerator	19	442	RD-0000-K-002	Cleaning the Grinder for Maintenance Work
SOP for Explosive Waste Incinerator	26	442	RD-0000-K-002	Cleaning and Inspecting Sumps
SOP for Explosive Waste Incinerator	27	442, 447	RD-0000-K-002	Draining Slurry Tanks
SOP for Explosive Waste Incinerator	38	442	RD-0000-K-002	Pumping Water From Grinder Building Basement to Trailer

MODULE III – LIST OF ATTACHMENTS

The following Attachments are incorporated, in their entirety, by reference into this Permit. These incorporated attachments are enforceable conditions of this Permit. Some of the documents contain excerpts from the Permittee's Hazardous Waste Permit Application. The Department has, as deemed necessary, modified specific language excerpted from the permit application. Additional modifications are prescribed in the Permit Conditions (Modules I through V), and thereby supersede the language of the attachments. Facility operations shall be in accordance with the contents of the Attachments and this Permit.

Attachment III. A - Air Emission Standards for Equipment Leaks

Attachment III.Aa – Air Emission Standards for Equipment Leaks for the EWI-CWP Complex

Attachment III.B - Scope of Work for Report on Control Device Technologies

Attachment III.Ba - Design Specifications for Subpart CC Tank Controls for the EWI-CWP Complex

Attachment III. A - Air Emission Standards for Equipment Leaks

III.A.1. Applicability

These requirements apply to the permitted treatment and storage area of the facility where hazardous wastes with organic concentrations of 0 to 30 percent by weight are treated, stored and/or disposed via incineration in two RCRA permitted rotary kiln incinerators and ancillary equipment.

The equipment subject to the Air Emissions Standards for Equipment Leaks (9 VAC 20-60-264; 40 CFR 264, Subpart BB) is that equipment that contains or contacts hazardous waste with organic concentrations of at least 10 percent by weight. The subject equipment, listed in Table III.A-1, is the equipment that comes into contact with the waste slurry, a light liquid pursuant to 40 CFR 264, Subpart BB, before it is fed to the rotary kiln incinerators. Figures III.A-1 through III.A-4 provide a graphical depiction of each piece of equipment subject to Subpart BB monitoring. This equipment includes various pumps, valves, and miscellaneous connections, each of which is marked in a manner such that they can be readily distinguished from other equipment. There are no compressors, pressure relief devices, sampling connecting systems, or open ended valves or lines that contact or contain such waste.

The maximum possible organic concentration of the waste that this equipment contacts or contains was determined from the maximum organic concentration (100%) of any propellant generated at the RFAAP. Before being burned in the incinerator, all propellants are ground into a slurry that is, at a minimum, 3.5 parts water for every part propellant. (This water to propellant ratio is a safety limitation, not a regulatory limitation.) Based on this specification, the maximum possible organic concentration (attributable to solid propellant) that the equipment listed in Table III.A-1 could contain or contact would be 22%. This is the basis used for the organic concentration of < 30% listed in Table III.A-1.

III.A.2. Definitions

All definitions used in this attachment have the meaning given them in 40 CFR Parts 260 to 266, including § 264.1051.

III.A.3. Standards: Pumps in Light Liquid Service

Each pump identified in Table III.A-1 is subject to the standards of 9 VAC 20-60-264; 40 CFR § 264.1052 for pumps in light liquid service. These pumps shall be monitored monthly using Reference Method 21, along with other procedures set forth in 9 VAC 20-60-264 and 40 CFR § 264.1063(b). Additionally, each of these pumps shall be visually inspected each calendar week for indications of liquids dripping from the pump seal.

A leak will be detected if an instrument reading of greater than 10,000 ppm is measured, or if visual observation indicates that liquids are dripping from the pump seal.

If a leak is detected, it shall be repaired as soon as possible, but no more than 15 days after the initial detection, unless conditions exist to delay repair of the pump as described in Section III.A.6. A first attempt of repair shall be made for all pumps within 5 days of the initial leak detection.

Of the pumps listed in Table III.A-1, none are equipped with dual mechanical seal systems that include a barrier fluid system, nor are any equipped with a closed vent system capable of capturing and transporting any leakage from the seal(s) to a control device. Therefore, none of these pumps are exempt from the monthly leak detection and repair standards.

If, at any point in time, one of the pumps indicated above should be designated by the operator for no detectable emissions, as indicated by an instrument reading of less than 500 ppm above background, it shall be tested for compliance initially upon designation, annually, and at any other time as requested by the Department. Any pump designated as such will have no externally actuated shaft that penetrates the pump housing and shall operate with emissions less than 500 ppm above background.

III.A.4. Standards: Valves in Gas/Vapor Service or Light Liquid Service

Each valve identified in Table III.A-1 is subject to the standards of 9 VAC 20-60-264 and 40 CFR § 264.1057 for valves in light liquid service. These valves, except for those with special designations, shall be monitored monthly using Reference Method 21, along with other procedures set forth in 9 VAC 20-60-264 and 40 CFR § 264.1063(b).

A leak will be detected if an instrument reading of greater than 10,000 ppm is measured.

If a leak is detected, it will be repaired as soon as possible, but no more than 15 days after the initial detection, unless conditions exist to delay repair of the valve as described in Section III.A.6. A first attempt of repair shall be made for all valves within 5 days of the initial leak detection. Repair attempts may include, but are not limited to, tightening the bonnet bolts, replacing the bonnet bolts, tightening the packing gland nuts, or injecting lubricant into the lubricated packing.

If results from valve monitoring indicate that no leaks have been detected on that valve for two successive months, the valve shall be monitored the first month of every succeeding quarter, beginning with the next quarter. If, during the quarterly monitoring, a leak is detected on one of the valves under quarterly monitoring, the valve will return to monthly monitoring.

Additionally, if, at any point in time, one of the valves indicated above should be designated by the operator for no detectable emissions, as indicated by an instrument reading of less than 500 ppm above background, it shall be tested for compliance initially upon designation, annually, and at any other time as requested by the Department. Any valve designated as such shall have no external actuating mechanism in contact with the hazardous waste stream and will operate with emissions less than 500 ppm above background.

Some of the valves in light liquid service have been designated as difficult to monitor because the valve cannot be monitored without elevating the monitoring personnel more than 2 meters above a support surface. The hazardous waste management unit within which these valves are located was in operation prior to June 21, 1990. Each of the valves designated as difficult to monitor shall be monitored at least once per calendar year.

Some of the valves in light liquid service have been designated as unsafe to monitor because they are located in the basement of the Grinder Building, which is a confined space. Personnel entering this area are required to wear oxygen monitoring equipment and may only remain in the area for a limited time. In addition, such monitoring exposes personnel to the pumping of waste slurry containing explosives, which can be unsafe. Each of the valves designated as unsafe to monitor shall be monitored at least once per calendar year.

III.A.5. Standards: Pumps and Valves in Heavy Liquid Service, Pressure Relief Devices in Light Liquid or Heavy Liquid Service, and Flanges and Other Connectors

This facility has no pumps or valves in heavy liquid service or pressure relief devices in light liquid service that are regulated by 9 VAC 20-60-264 or 40 CFR § 264.1058. However, this facility does have some flanges and other connectors, listed in Table III.A-1, that contain or contact hazardous waste with organic concentrations of at least 10 percent by weight, and therefore, are subject to the standards of 9 VAC 20-60-264 and 40 CFR § 264.1058.

Each of the connectors identified in Table III.A-1 are subject to the standards for flanges and other connectors. These connectors shall be monitored within 5 days using Reference Method 21, along with other procedures set forth in 9 VAC 20-60-264 and 40 CFR 264.1063(b), if evidence of a potential leak is found by visual, audible, olfactory or any other detection method.

A leak will be detected if an instrument reading of greater than 10,000 ppm is measured.

If a leak is detected, it shall be repaired as soon as possible, but no more than 15 days after the initial detection, unless conditions exist to delay repair of the connector. A first attempt of repair will be made for all flanges and other connectors within 5 days of the initial leak detection. Repair attempts may include, but are not limited to, tightening the bonnet bolts, replacing the bonnet bolts, tightening the packing gland nuts, or injecting lubricant into the lubricated packing.

III.A.6. Delay of Repair

Delay of repair, as regulated by 9 VAC 20-60-264 and 40 CFR § 264.1059, will be allowed for the equipment subject to these regulations if the repair is technically infeasible without a hazardous waste management unit shutdown. If the repair is delayed because of this reason, it will be completed before the end of the next hazardous waste management unit shutdown.

Additionally, repair may be delayed for equipment that is isolated from the hazardous waste management unit, provided that the piece of equipment does not continue to contain or contact hazardous waste with organic concentrations of at least 10 percent by weight.

If repair is to be delayed for valves, the owner or operator shall have determined that emissions of purged material resulting from immediate repair are greater than those resulting from delay of the repair. When the repair is completed, the purged material will be collected and destroyed, or recovered in a control device.

Delay of repair for valves beyond the unit shutdown will be allowed if replacement of the valve assembly is necessary during the unit shutdown, and if the valve assembly supplies were sufficiently stocked, but have since been depleted. Delay of repair beyond the next unit shutdown shall not be permitted unless the shutdown occurs within 6 months of the previous hazardous waste management unit shutdown.

Leaks from pumps for which delay of repair is permitted will be those leaks that require the use of a dual mechanical seal system, equipped with a barrier fluid, to complete repair. Such leaks from pumps shall be repaired no later than 6 months after the leak is detected.

III.A.7. Test Methods and Procedures

Leak detection monitoring shall be conducted in accordance with 9 VAC 20-60-264, 40 CFR § 264.1063, and, consequently, Reference Method 21 as described in 40 CFR Part 60, by traversing the probe around and as close as possible to all potential leak interfaces.

The detection instrument used will meet the performance standards set forth in this method and shall be calibrated before use on each day of its use by the procedures indicated in Reference Method 21. The calibration gases for the leak detection instrument will be zero air, with less than 10 ppm of hydrocarbon in the air, and a mixture of methane or n-hexane and air at a concentration of at least 10,000 ppm methane or n-hexane.

If, at any time, the operator designates any of the equipment listed in Table III.A-1 for no detectable emissions, a performance test shall be conducted. The methods used to conduct these performance tests, including determination of the background level, shall be determined as described in Reference Method 21. The difference between the maximum concentration indicated by the instrument reading and the background level shall be less than 500 ppm to confirm compliance.

Determinations of the organic concentration in the waste stream at each piece of equipment have been made using process knowledge as detailed previously in Section III.A.1.

III.A.8. Recordkeeping Requirements

The Permittee must maintain, in the facility operating record, the following information for each piece of equipment subject to the Air Emissions Standards for Equipment Leaks, as required by 9 VAC 20-60-264 and 40 CFR § 264.1064:

- The equipment identification number and hazardous waste management unit identification;
- The location of the subject equipment within the facility, indicated on a facility plot plan;
- The type of equipment (e.g., pump, or valve);
- The percent-by-weight total organics in the hazardous waste stream at the equipment;
- The hazardous waste state at the equipment (e.g., gas/vapor, or liquid); and
- The method of compliance with the standard (e.g., monthly leak detection and repair).

Should a leak be detected, a weatherproof and readily visible identification tag, marked with the equipment ID number, the date evidence of a potential leak was found, and the date the leak was detected, will be attached to the piece of equipment. For all equipment, except valves, this tag will be removed once the leak is repaired. For valves, this tag will be removed after the valve has gone two successive months without a leak being detected.

Leak detection information must be recorded in an inspection log that is kept with the facility operating record. This log must indicate the following for each piece of equipment for which a leak is detected:

- The instrument and operator identification numbers, and equipment ID number;
- The date that evidence of a potential leak was found;
- The date that the leak was detected, and the dates of each repair attempt;
- The repair method(s) applied in each attempt to repair the leak;
- The results of the repair attempt, recorded as one of the following:
  - "Above 10,000" if the equipment is still leaking;
  - "Repaired" if the repair has been completed; or
  - "Repair Delayed" if the repair cannot be completed within 15 days after discovery of the leak;
- If "Repair Delayed" is recorded, the reason for delay and the expected date of repair must also be recorded;
- The documentation supporting the delay of repair of a valve past a hazardous waste management unit shutdown, accompanied with a signature of the owner, operator, or designate who made the decision that repair of the valve would be delayed; and
- The date of successful repair of the leak.

In addition to the information above, the following information must be kept in a log that is recorded in the facility operating record. This information must be available upon request of the Director.

- A list of identification numbers for each piece of equipment subject to the regulations;
- A list of identification numbers, signed by the owner or operator, for equipment designated for no detectable emissions; and

- A list indicating the dates of each compliance test, the background level measured during the test, and the maximum instrument reading measured for the equipment.

A list must be maintained of the identification numbers for those valves which are designated as either unsafe or difficult to monitor. With this list, the explanation for each designation, and the schedule for monitoring each valve must also be recorded.

All of the records described above relating to leak detection and repair results must be kept for at least 3 years in the facility operating record.

ATTACHMENT III.A, TABLE III.A-1
EQUIPMENT SUBJECT TO THE AIR EMISSION STANDARDS FOR EQUIPMENT LEAKS

Equipment ID No.	Monitoring Point ID	Location	Type of Equipment	Service	% Organic	Method of Compliance
P-1A	CT	Grinder Building	Pump	Light Liquid	0 to 30%	Monthly LDAR
P-1B	C	Grinder Building	Pump	Light Liquid	0 to 30%	Monthly LDAR
P-440	ED	440 Pump House	Pump	Light Liquid	0 to 30%	Monthly LDAR
P-441	CD	441 Pump House	Pump	Light Liquid	0 to 30%	Monthly LDAR
V-440A	DV	440 Pump House	Valve	Light Liquid	0 to 30%	Monthly LDAR
V-440B	DZ	440 Pump House	Valve	Light Liquid	0 to 30%	Monthly LDAR
V-441A	BY	441 Pump House	Valve	Light Liquid	0 to 30%	Monthly LDAR
V-441B	CA	441 Pump House	Valve	Light Liquid	0 to 30%	Monthly LDAR
V-14	CM	Grinder Building	Valve: Unsafe to monitor	Light Liquid	0 to 30%	Annual LDAR
V-15	B	Grinder Building	Valve: Unsafe to monitor	Light Liquid	0 to 30%	Annual LDAR
V-17A	CW	Grinder Building	Valve: Unsafe to monitor	Light Liquid	0 to 30%	Annual LDAR
V-17B	L	Grinder Building	Valve: Unsafe to monitor	Light Liquid	0 to 30%	Annual LDAR
V-18A	CV	Grinder Building	Valve: Unsafe to monitor	Light Liquid	0 to 30%	Annual LDAR

ATTACHMENT III.A, TABLE III.A-1
EQUIPMENT SUBJECT TO THE AIR EMISSION STANDARDS FOR EQUIPMENT LEAKS

Equipment ID No.	Monitoring Point ID	Location	Type of Equipment	Service	% Organic	Method of Compliance
V-18B	K	Grinder Building	Valve: Unsafe to monitor	Light Liquid	0 to 30%	Annual LDAR
V-27A	EN	Grinder Building	Valve: Unsafe to monitor	Light Liquid	0 to 30%	Annual LDAR
V-27B	BW	Grinder Building	Valve: Unsafe to monitor	Light Liquid	0 to 30%	Annual LDAR
V-130A	FU	Grinder Building	Valve: Unsafe to monitor	Light Liquid	0 to 30%	Annual LDAR
V-130B	FT	Grinder Building	Valve: Unsafe to monitor	Light Liquid	0 to 30%	Annual LDAR
V-300	N	Grinder Building	Valve: Unsafe to monitor	Light Liquid	0 to 30%	Annual LDAR
MBV-1	FY	Grinder Building	Valve: Unsafe to monitor	Light Liquid	0 to 30%	Annual LDAR
MBV-2	GA	Grinder Building	Valve: Unsafe to monitor	Light Liquid	0 to 30%	Annual LDAR
V-440S	AG	Slurry Loop	Valve: Difficult to Monitor	Light Liquid	0 to 30%	Annual LDAR
V-440R	AF	Slurry Loop	Valve: Difficult to Monitor	Light Liquid	0 to 30%	Annual LDAR
V-441S	AH	Slurry Loop	Valve: Difficult to Monitor	Light Liquid	0 to 30%	Annual LDAR
V-441R	BC	Slurry Loop	Valve: Difficult to Monitor	Light Liquid	0 to 30%	Annual LDAR
CON-A	A	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]

ATTACHMENT III.A, TABLE III.A-1
EQUIPMENT SUBJECT TO THE AIR EMISSION STANDARDS FOR EQUIPMENT LEAKS

Equipment ID No.	Monitoring Point ID	Location	Type of Equipment	Service	% Organic	Method of Compliance
CON-D	D	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-E	E	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-F	F	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-G	G	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-H	H	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-M	M	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-O	O	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-Q	Q	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-R	R	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-S	S	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-T	T	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-BF	BF	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-BO	BO	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]

ATTACHMENT III.A, TABLE III.A-1
EQUIPMENT SUBJECT TO THE AIR EMISSION STANDARDS FOR EQUIPMENT LEAKS

Equipment ID No.	Monitoring Point ID	Location	Type of Equipment	Service	% Organic	Method of Compliance
CON-BP	BP	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-BQ	BQ	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-BR	BR	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-BS	BS	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-BU	BU	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-CN	CN	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-CO	CO	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-CP	CP	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-CQ	CQ	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-CR	CR	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-CS	CS	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-CU	CU	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-FA	FA	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]

ATTACHMENT III.A, TABLE III.A-1
EQUIPMENT SUBJECT TO THE AIR EMISSION STANDARDS FOR EQUIPMENT LEAKS

Equipment ID No.	Monitoring Point ID	Location	Type of Equipment	Service	% Organic	Method of Compliance
CON-FB	FB	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-FC	FC	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-FD	FD	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-FE	FE	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-FF	FF	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-FG	FG	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-FH	FH	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-FI	FI	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-FJ	FJ	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-FK	FK	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-FL	FL	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-FM	FM	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-FN	FN	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]

ATTACHMENT III.A, TABLE III.A-1
EQUIPMENT SUBJECT TO THE AIR EMISSION STANDARDS FOR EQUIPMENT LEAKS

Equipment ID No.	Monitoring Point ID	Location	Type of Equipment	Service	% Organic	Method of Compliance
CON-FO	FO	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-FP	FP	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-FQ	FQ	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-FR	FR	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-FS	FS	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-FV	FV	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-FW	FW	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-FX	FX	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-FZ	FZ	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-GB	GB	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-GC	GC	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-GD	GD	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-GE	GE	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]

ATTACHMENT III.A, TABLE III.A-1
EQUIPMENT SUBJECT TO THE AIR EMISSION STANDARDS FOR EQUIPMENT LEAKS

Equipment ID No.	Monitoring Point ID	Location	Type of Equipment	Service	% Organic	Method of Compliance
CON-GF	GF	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-GG	GG	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-GH	GH	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-GI	GI	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
SG-1	BV	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
PIT-1	PIT-1	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
PIT-2	PIT-2	Grinder Building	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-DW	DW	440 Pump House	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-DX	DX	440 Pump House	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-DY	DY	440 Pump House	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-EA	EA	440 Pump House	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-EB	EB	440 Pump House	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-EC	EC	440 Pump House	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]

ATTACHMENT III.A, TABLE III.A-1
EQUIPMENT SUBJECT TO THE AIR EMISSION STANDARDS FOR EQUIPMENT LEAKS

Equipment ID No.	Monitoring Point ID	Location	Type of Equipment	Service	% Organic	Method of Compliance
CON-EE	EE	440 Pump House	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-EF	EF	440 Pump House	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-EG	EG	440 Pump House	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-EH	EH	440 Pump House	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-EJ	EJ	440 Pump House	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-EK	EK	440 Pump House	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-EL	EL	440 Pump House	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-JA	JA	440 Pump House	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-JB	JB	440 Pump House	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-JC	JC	440 Pump House	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-JD	JD	440 Pump House	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-JE	JE	440 Pump House	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-JF	JF	440 Pump House	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]

ATTACHMENT III.A, TABLE III.A-1
EQUIPMENT SUBJECT TO THE AIR EMISSION STANDARDS FOR EQUIPMENT LEAKS

Equipment ID No.	Monitoring Point ID	Location	Type of Equipment	Service	% Organic	Method of Compliance
CON-JG	JG	440 Pump House	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-JH	JH	440 Pump House	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-JH	JL	440 Pump House	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-AQ	AQ	441 Pump House	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-AR	AR	441 Pump House	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-AS	AS	441 Pump House	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-AT	AT	441 Pump House	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-BZ	BZ	441 Pump House	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-CB	CB	441 Pump House	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-CC	CC	441 Pump House	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-CE	CE	441 Pump House	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-CF	CF	441 Pump House	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-CG	CG	441 Pump House	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]

ATTACHMENT III.A, TABLE III.A-1
EQUIPMENT SUBJECT TO THE AIR EMISSION STANDARDS FOR EQUIPMENT LEAKS

Equipment ID No.	Monitoring Point ID	Location	Type of Equipment	Service	% Organic	Method of Compliance
CON-CH	CH	441 Pump House	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-CI	CI	441 Pump House	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-HA	HA	441 Pump House	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-HB	HB	441 Pump House	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-HC	HC	441 Pump House	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-HD	HD	441 Pump House	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-HE	HE	441 Pump House	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-HF	HF	441 Pump House	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-HG	HG	441 Pump House	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-HH	HH	441 Pump House	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-HI	HI	441 Pump House	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-HJ	HJ	441 Pump House	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-U	U	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-V	V	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-W	W	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]

ATTACHMENT III.A, TABLE III.A-1
EQUIPMENT SUBJECT TO THE AIR EMISSION STANDARDS FOR EQUIPMENT LEAKS

Equipment ID No.	Monitoring Point ID	Location	Type of Equipment	Service	% Organic	Method of Compliance
CON-X	X	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-Y	Y	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-Z	Z	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-AA	AA	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-AB	AB	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-AC	AC	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-AD	AD	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-AE	AE	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-AI	AI	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-AJ	AJ	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-AK	AK	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-AL	AL	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-AM	AM	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-AN	AN	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-AO	AO	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-AP	AP	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-AU	AU	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-AV	AV	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-AW	AW	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-AX	AX	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-AY	AY	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-AZ	AZ	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-BA	BA	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-BB	BB	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-BD	BD	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]

ATTACHMENT III.A, TABLE III.A-1
EQUIPMENT SUBJECT TO THE AIR EMISSION STANDARDS FOR EQUIPMENT LEAKS

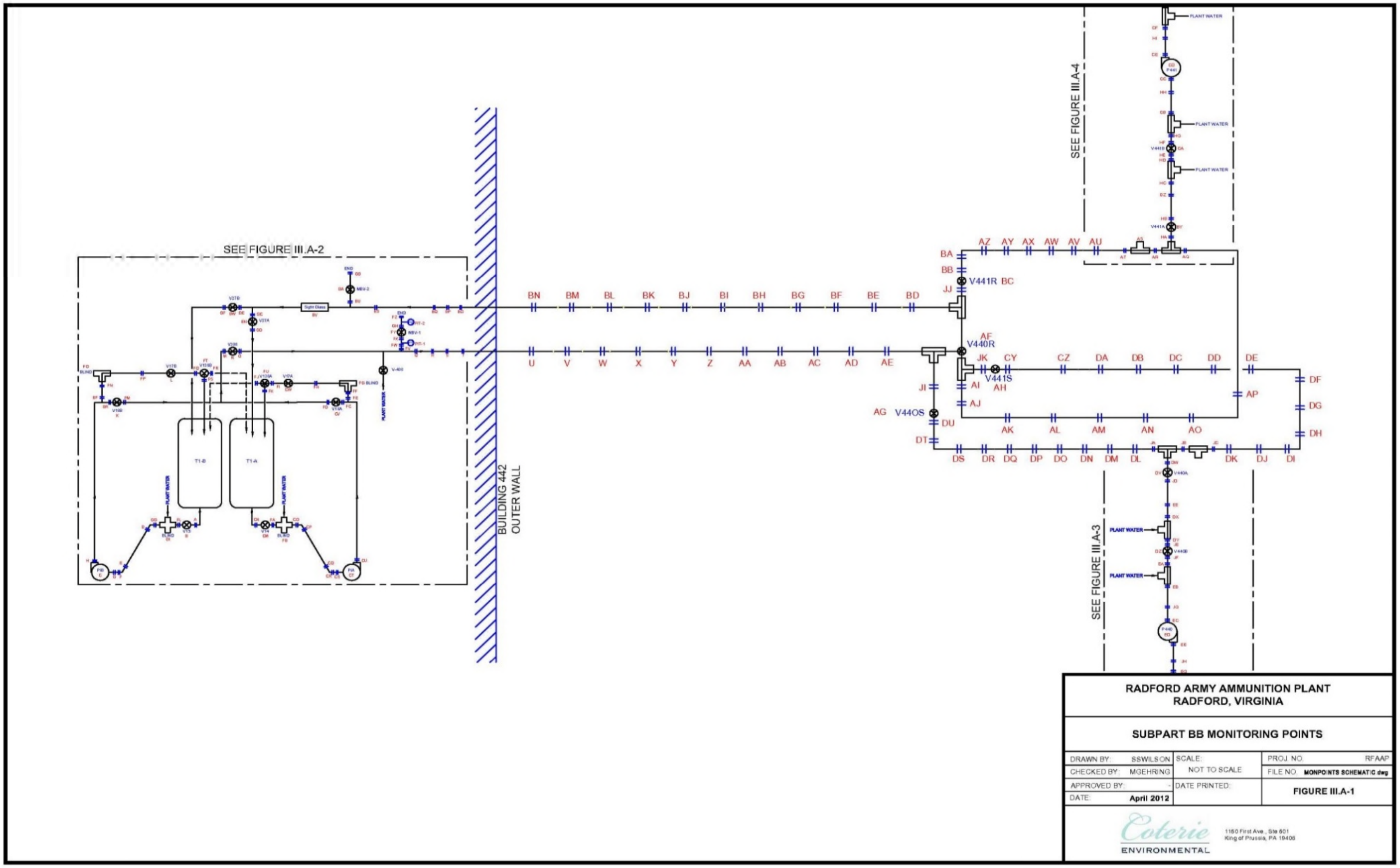
Equipment ID No.	Monitoring Point ID	Location	Type of Equipment	Service	% Organic	Method of Compliance
CON-BE	BE	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-BF	BF	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-BG	BG	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-BH	BH	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-BI	BI	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-BJ	BJ	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-BK	BK	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-BL	BL	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-BM	BM	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-BN	BN	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-CY	CY	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-CZ	CZ	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-DA	DA	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-DB	DB	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-DC	DC	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-DD	DD	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-DE	DE	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-DF	DF	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-DG	DG	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-DH	DH	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-DI	DI	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-DJ	DJ	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-DK	DK	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-DL	DL	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-DM	DM	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]

ATTACHMENT III.A, TABLE III.A-1
EQUIPMENT SUBJECT TO THE AIR EMISSION STANDARDS FOR EQUIPMENT LEAKS

Equipment ID No.	Monitoring Point ID	Location	Type of Equipment	Service	% Organic	Method of Compliance
CON-DN	DN	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-DO	DO	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-DP	DP	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-DQ	DQ	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-DR	DR	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-DS	DS	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-DT	DT	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-DU	DU	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-JI	JI	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-JJ	JJ	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]
CON-JK	JK	Slurry Loop	Connection	Light Liquid	0 to 30%	LDAR for Connectors [1]

1. Any component for which the method of compliance is shown as "LDAR for Connectors" will be monitored within 5 days using Reference Method 21, along with other procedures set forth in 9 VAC 20-60-264; and 40 CFR 264.1063(b), if evidence of a potential leak is found by visual, audible, olfactory or any other detection method. Absent this, no set monitoring frequency is specified.

Figure III.A-1 – Subpart BB Monitoring Points



Attachment III.Aa - Air Emission Standards For Equipment Leaks or the EWI-CWP Complex

III.Aa.1. Applicability

These requirements apply to those portions of the EWI-CWP complex where hazardous wastes with organic concentrations of 0 to 30 percent by weight are treated, stored and/or disposed via thermal treatment in the two rotary kiln incinerators.

The equipment subject to the Air Emissions Standards for Equipment Leaks (9 VAC 20-60-264; 40 CFR Part 264, Subpart BB) is that equipment that contains or contacts hazardous waste with organic concentrations of at least 10 percent by weight. The subject equipment, listed in Table III.Aa-1, is the equipment that comes into contact with the waste slurry when it is at a 3:1 ratio. At this point, the waste slurry is a light liquid as defined in 40 CFR Part 264, Subpart BB. Figures III.Aa-1 through III.Aa-3 provide a graphical depiction of each piece of equipment subject to Subpart BB monitoring. This equipment includes various pumps, valves, and miscellaneous connections, each of which is marked in a manner such that they can be readily distinguished from other equipment. There are no compressors, sampling connecting systems, or open-ended valves or lines that contact or contain such waste.

The maximum possible organic concentration of the waste that this equipment contacts or contains was determined from the maximum organic concentration (100%) of any propellant generated at the RFAAP. Before being burned in the rotary kiln incinerators, all propellants are ground into a slurry for safe processing throughout the system. During the initial grinding steps, the slurry is maintained at a 10:1 ratio (10 parts water for every part propellant). This helps to ensure that the materials are not ignited or do not explode while being ground. Once all grinding steps are complete and the slurry is transferred to one of the slurry storage tanks, water is decanted off of the tank and the slurry is reduced to a 3:1 ratio. This 3:1 ratio has been demonstrated to be a non-propagating and non-detonable proportion and is maintained to help prevent an event in one area of the plant from propagating through the slurry loop to another portion of the plant. Neither the 10:1 or 3:1 ratios are environmental compliance requirements; they are safety limitations placed on the process.

Based on these specifications, the maximum possible organic concentration (attributable to solid propellant) in the 10:1 slurry would be 9 percent, and the maximum possible organic concentration in the 3:1 slurry would be 25%. Therefore, all material in contact with the 3:1 slurry is subject to Subpart BB. This is the basis for listing of equipment in Table III.Aa-1.

III.Aa.2. Definitions

All definitions used in this attachment have the meaning given them in 40 CFR Parts 260 to 266, including §264.1051.

III.Aa.3. Standards: Pumps in Light Liquid Service

Each pump identified in Table III.Aa-1 is subject to the standards of 9 VAC 20-60-264; 40 CFR §264.1052 for pumps in light liquid service. These pumps shall be monitored monthly using Reference Method 21, along with other procedures set forth in 9 VAC 20-60-264 and 40 CFR §264.1063(b). Additionally, each of these pumps shall be visually inspected each calendar week for indications of liquids dripping from the pump seal.

A leak will be detected if an instrument reading of greater than 10,000 ppm is measured, or if visual observation indicates that liquids are dripping from the pump seal.

If a leak is detected, it shall be repaired as soon as possible, but no more than 15 days after the initial detection, unless conditions exist to delay repair of the pump as described in Section III.Aa.6. A first attempt of repair shall be made for all pumps within 5 days of the initial leak detection.

Of the pumps listed in Table III.Aa-1, none are equipped with dual mechanical seal systems that include a barrier fluid system, nor are any equipped with a closed vent system capable of capturing and transporting any leakage from the seal(s) to a control device. Therefore, none of these pumps are exempt from the monthly leak detection and repair standards.

If, at any point in time, one of the pumps indicated above should be designated by the operator for no detectable emissions, as indicated by an instrument reading of less than 500 ppm above background, it shall be tested for compliance initially upon designation, annually, and at any other time as requested by the Department. Any pump designated as such shall have no externally actuated shaft that penetrates the pump housing and will operate with emissions less than 500 ppm above background.

III.Aa.4. Standards: Pressure Relief Devices in Gas/Vapor Service

Each permitted hazardous waste tank is equipment with a pressure relief device (conservation vent) to comply with the Subpart CC requirements. Each of these pressure relief devices shall be monitored originally and after each pressure relief event to make sure that it operates with no detectable emissions (instrument reading less than 500 ppm above background).

In the event that the device is measured to have emissions in excess of 500 ppm above background it shall be repaired or replaced as required by 9 VAC 20-60-264 and 40 CFR Part 264, Subpart BB.

III.Aa.5. Standards: Valves in Light Liquid Service

There are many valves, all identified in Table III.Aa-1, operating in light liquid service in the slurry distribution system that are subject to the standards of 9 VAC 20-60-264 and 40 CFR §264.1057. However, most of these valves are butterfly valves, selected for this design because they are designated as having no detectable emissions (NDE), as the manufacturer specifies that the valve operates with emissions of less than 100 ppmv. Compliance of these valves with the NDE specification shall be provided initially and annually thereafter. For the handful of valves included in the system that have not received an NDE specification, RFAAP shall monitor the valve monthly using Reference Method 21, along with other procedures set forth in 9 VAC 20-60-264 and 40 CFR §264.1063(b).

In any case, a leak will be detected if an instrument reading of greater than 10,000 ppm is measured. If a leak is detected, it shall be repaired as soon as possible, but no more than 15 days after the initial detection, unless conditions exist to delay repair of the valve as described in Section III.Aa.6. A first attempt of repair shall be made for all valves within 5 days of the initial leak detection. Repair attempts may include, but are not limited to, tightening the bonnet bolts, replacing the bonnet bolts, tightening the packing gland nuts, or injecting lubricant into the lubricated packing.

If results from valve monitoring indicate that no leaks have been detected on that valve for two successive months, the valve shall be monitored the first month of every succeeding quarter, beginning with the next quarter. If, during the quarterly monitoring, a leak is detected on one of the valves under quarterly monitoring, the valve will return to monthly monitoring.

Additionally, if, at any point in time, one of the valves indicated above should be designated by the operator for no detectable emissions, as indicated by an instrument reading of less than 500 ppm above background, it shall be tested for compliance initially upon designation, annually, and at any other time as requested by the Department. Any valve designated as such shall have no external actuating mechanism in contact with the hazardous waste stream and will operate with emissions less than 500 ppm above background.

III.Aa.6. Standards: Pumps and Valves in Heavy Liquid Service, Pressure Relief Devices in Light Liquid or Heavy Liquid Service, and Flanges and Other Connectors

All pumps, valves, flanges and other connectors in the slurry lines between the grinder tanks and the slurry tanks, where the slurry is in a 10;1 ratio, are subject to the requirements of 9 VAC 20-60-264 and 40 CFR §264.1058 for pumps and valves in heavy liquid service. Each of these devices shall be monitored using Reference Method 21 within 5 days of detecting evidence of a leak by visual, audible, olfactory, or any other detection method.

This facility also includes flanges and other connectors, listed in Table III.Aa-1, that contain or contact hazardous waste with organic concentrations of at least 10 percent by weight (slurry at a 3:1 ratio), and therefore, are subject to the standards of 9 VAC 20-60-264 and 40 CFR §264.1058. Each of the connectors identified in Table III.Aa-1 are subject to the standards for flanges and other connectors. These connectors shall be monitored within 5 days using Reference Method 21, along with other procedures set forth in 9 VAC 20-60-264 and 40 CFR §264.1063(b), if evidence of a potential leak is found by visual, audible, olfactory or any other detection method.

For both the pumps and valves in heavy liquid service and those flanges and connectors in light liquid service, a leak will be detected if an instrument reading of greater than 10,000 ppm is measured.

If a leak is detected, it shall be repaired as soon as possible, but no more than 15 days after the initial detection, unless conditions exist to delay repair of the connector. A first attempt of repair shall be made for all flanges and other connectors within 5 days of the initial leak detection. Repair attempts may include, but are not limited to, tightening the bonnet bolts, replacing the bonnet bolts, tightening the packing gland nuts, or injecting lubricant into the packing.

III.Aa.7. Delay of Repair

Delay of repair, as regulated by 9 VAC 20-60-264 and 40 CFR §264.1059, will be allowed for the equipment subject to these regulations if the repair is technically infeasible without a hazardous waste management unit shutdown. If the repair is delayed because of this reason, it shall be completed before the end of the next hazardous waste management unit shutdown.

Additionally, repair may be delayed for equipment that is isolated from the hazardous waste management unit, provided that the piece of equipment does not continue to contain or contact hazardous waste with organic concentrations of at least 10 percent by weight.

If repair is to be delayed for valves, the owner or operator will have determined that emissions of purged material resulting from immediate repair are greater than those resulting from delay of the repair. When the repair is completed, the purged material will be collected and destroyed, or recovered in a control device.

Delay of repair for valves beyond the unit shutdown will be allowed if replacement of the valve assembly is necessary during the unit shutdown, and if the valve assembly supplies were sufficiently stocked, but have since been depleted. Delay of repair beyond the next unit shutdown will not be permitted unless the shutdown occurs within 6 months of the previous hazardous waste management unit shutdown.

Leaks from pumps for which delay of repair is permitted will be those leaks that require the use of a dual mechanical seal system, equipped with a barrier fluid, to complete repair. Such leaks from pumps shall be repaired no later than 6 months after the leak is detected.

III.Aa.8. Test Methods and Procedures

Leak detection monitoring shall be conducted in accordance with 9 VAC 20-60-264, 40 CFR §264.1063, and, consequently, Reference Method 21 as described in 40 CFR Part 60, by traversing the probe around and as close as possible to all potential leak interfaces.

The detection instrument used will meet the performance standards set forth in this method and will be calibrated before use on each day it is used to conduct Reference Method 21 monitoring. The calibration gases for the leak detection instrument will be zero air, with less than 10 ppm of hydrocarbon in the air, and a mixture of methane or n-hexane and air at a concentration of at least 10,000 ppm methane or n-hexane.

If, at any time, the operator designates any of the equipment listed in Table III.Aa-1 for no detectable emissions, a performance test will be conducted. The methods used to conduct these performance tests, including determination of the background level, will be determined as described in Reference Method 21. The difference between the maximum concentration indicated by the instrument reading and the background level will be less than 500 ppm to confirm compliance.

Determinations of the organic concentration in the waste stream at each piece of equipment have been made using process knowledge as detailed previously in Section III.Aa.1.

III.Aa.9. Recordkeeping Requirements

The Permittee must maintain, in the facility operating record, the following information for each piece of equipment subject to the Air Emissions Standards for Equipment Leaks, as required by 9 VAC 20-60-264 and 40 CFR §264.1064:

- The equipment identification number and hazardous waste management unit identification;
- The location of the subject equipment within the facility, indicated on a facility plot plan;
- The type of equipment (e.g. pump, or valve);
- The percent-by-weight total organics in the hazardous waste stream at the equipment;
- The hazardous waste state at the equipment (e.g. gas/vapor, or liquid); and
- The method of compliance with the standard (e.g. monthly leak detection and repair).

Should a leak be detected, a weatherproof and readily visible identification tag, marked with the equipment ID number, the date evidence of a potential leak was found, and the date the leak was detected, will be attached to the piece of equipment. For all equipment, except valves, this tag will be removed once the leak is repaired. For valves, this tag will be removed after the valve has gone two successive months without a leak being detected.

Leak detection information must be recorded in an inspection log that is kept in the facility operating record. This log must indicate the following for each piece of equipment for which a leak is detected:

- The instrument and operator identification numbers, and equipment ID number;
- The date that evidence of a potential leak was found;
- The date that the leak was detected, and the dates of each repair attempt;
- The repair method(s) applied in each attempt to repair the leak;

- The results of the repair attempt, recorded as one of the following:
  - “Above 10,000” if the equipment is still leaking;
  - “Repaired” if the repair has been completed; or
  - “Repair Delayed” if the repair cannot be completed within 15 days after discovery of the leak;
- If “Repair Delayed” is recorded, the reason for delay and the expected date of repair will also be recorded;
- The documentation supporting the delay of repair of a valve past a hazardous waste management unit shutdown, accompanied with a signature of the owner, operator, or designee who made the decision that repair of the valve would be delayed; and
- The date of successful repair of the leak.

In addition to the information above, the following information must be kept in a log that is recorded in the facility operating record. This information must be available upon request of the Director:

- A list of identification numbers for each piece of equipment subject to the regulations;
- A list of identification numbers, signed by the owner or operator, for equipment designated for no detectable emissions; and
- A list indicating the dates of each compliance test, the background level measured during the test, and the maximum instrument reading measured for the equipment.

A list must be maintained of the identification numbers for those valves that are designated as either unsafe or difficult to monitor. With this list, the explanation for each designation, and the schedule for monitoring each valve must also be recorded.

All of the records described above relating to leak detection and repair results must be kept for at least 3 years in the facility operating record.

Table III.Aa-1
Equipment Subject to the Air Emission Standards for Equipment Leaks

Equipment ID No.	Monitoring Point ID	Description	Type of Equipment	Service	% Organic	Method of Compliance
613-P-30220	2015	Make-up water transfer pump	Pump	Light Liquid	0 to 25%	Monthly LDAR
613-P-30203	3076	Slurry Delivery Pump #1	Pump	Light Liquid	0 to 25%	Monthly LDAR
613-P-30207	3077	Slurry Delivery Pump #2	Pump	Light Liquid	0 to 25%	Monthly LDAR
613-P-30200	3078	Slurry recirculation pump	Pump	Light Liquid	0 to 25%	Monthly LDAR
613-T-30079 (vent)	1093	Conservation vent slurry tank #1	Pressure relief device	Gas/vapor service	N/A	LDAR after event
613-T-30197 (vent)	1094	Conservation vent slurry tank #3	Pressure relief device	Gas/vapor service	N/A	LDAR after event
613-T-30164 (vent)	1095	Conservation vent slurry tank #2	Pressure relief device	Gas/vapor service	N/A	LDAR after event
613-T-30015 (vent)	2019	Conservation vent makeup tank	Pressure relief device	Gas/vapor service	N/A	LDAR after event
613-T-30028 (vent)	2025	Conservation vent decant tank	Pressure relief device	Gas/vapor service	N/A	LDAR after event

Table III.Aa-1
Equipment Subject to the Air Emission Standards for Equipment Leaks

Equipment ID No.	Monitoring Point ID	Description	Type of Equipment	Service	% Organic	Method of Compliance
HV-30241	30241	Three-way valve in slurry line from Tank #1 to delivery pumps	Valve	Light liquid	0 to 25%	Monthly LDAR
HV-30173	30173	Three-way valve in slurry line from Tank #2 to delivery pumps	Valve	Light liquid	0 to 25%	Monthly LDAR
HV-30195	30195	Three-way valve in slurry line from Tank #3 to delivery pumps	Valve	Light liquid	0 to 25%	Monthly LDAR
XV-30016	2020	Sample valve on makeup tank	Valve	Light liquid	0 to 25%	Monthly LDAR
XV-30306	2021	Valve in line from makeup water transfer pump to decant tank	Valve	Light liquid	0 to 25%	Monthly LDAR
XV-30305	2022	Valve in line from makeup tank to makeup water transfer pump	Valve	Light liquid	0 to 25%	Monthly LDAR

Table III.Aa-1
Equipment Subject to the Air Emission Standards for Equipment Leaks

Equipment ID No.	Monitoring Point ID	Description	Type of Equipment	Service	% Organic	Method of Compliance
HV-30129	2023	Valve in line from makeup tank to makeup water transfer pump	Valve	Light liquid	0 to 25%	Monthly LDAR
HV-30239	1009	Butterfly valve in slurry line to Tank#1 from incinerators	Valve (no detectable emissions)	Light Liquid	0 to 25%	Annual LDAR
HV-30084	1008	Butterfly valve in slurry line leaving Tank#1	Valve (no detectable emissions)	Light Liquid	0 to 25%	Annual LDAR
HV-30162	1019	Butterfly valve in slurry line to Tank#2 from incinerators	Valve (no detectable emissions)	Light Liquid	0 to 25%	Annual LDAR
HV-30169	1027	Butterfly valve in slurry line leaving Tank#2	Valve (no detectable emissions)	Light Liquid	0 to 25%	Annual LDAR
HV-30240	1038	Butterfly valve in slurry line to Tank#3 from incinerators	Valve (no detectable emissions)	Light Liquid	0 to 25%	Annual LDAR

Table III.Aa-1
Equipment Subject to the Air Emission Standards for Equipment Leaks

Equipment ID No.	Monitoring Point ID	Description	Type of Equipment	Service	% Organic	Method of Compliance
HV-30191	1046	Butterfly valve in slurry line leaving Tank#3	Valve (no detectable emissions)	Light Liquid	0 to 25%	Annual LDAR
XV-60528	1096	Butterfly hand valve in slurry line from delivery pumps to incinerators	Valve (no detectable emissions)	Light Liquid	0 to 25%	Annual LDAR
HV-60531	1097	Butterfly valve in slurry line from delivery pumps to incinerators	Valve (no detectable emissions)	Light Liquid	0 to 25%	Annual LDAR
XV-30046	2031	Butterfly hand valve in line from decant tank to grinder tanks	Valve (no detectable emissions)	Light Liquid	0 to 25%	Annual LDAR
XV-30268	3092	Butterfly hand valve in slurry line from storage tanks to delivery pumps	Valve (no detectable emissions)	Light Liquid	0 to 25%	Annual LDAR

Table III.Aa-1
Equipment Subject to the Air Emission Standards for Equipment Leaks

Equipment ID No.	Monitoring Point ID	Description	Type of Equipment	Service	% Organic	Method of Compliance
HV-30202	3093	Butterfly valve in slurry line from storage tanks to Delivery Pump #1	Valve (no detectable emissions)	Light Liquid	0 to 25%	Annual LDAR
HV-30206	3095	Butterfly valve in slurry line from storage tanks to Delivery Pump #2	Valve (no detectable emissions)	Light Liquid	0 to 25%	Annual LDAR
HV-30205	3094	Butterfly valve in slurry line from to Delivery Pump #1 to incinerators	Valve (no detectable emissions)	Light Liquid	0 to 25%	Annual LDAR
HV-30209	3096	Butterfly valve in slurry line from to Delivery Pump #2 to incinerators	Valve (no detectable emissions)	Light Liquid	0 to 25%	Annual LDAR
HV-30086	3098	Butterfly valve on slurry line from recirculation loop into Tank #1	Valve (no detectable emissions)	Light Liquid	0 to 25%	Annual LDAR

Table III.Aa-1
Equipment Subject to the Air Emission Standards for Equipment Leaks

Equipment ID No.	Monitoring Point ID	Description	Type of Equipment	Service	% Organic	Method of Compliance
HV-30163	3097	Butterfly valve on slurry line from recirculation loop into Tank #2	Valve (no detectable emissions)	Light Liquid	0 to 25%	Annual LDAR
HV-30178	3099	Butterfly valve on slurry line from recirculation loop into Tank #3	Valve (no detectable emissions)	Light Liquid	0 to 25%	Annual LDAR
HV-30339	3100	Butterfly hand valve on discharge of recirculation pump	Valve (no detectable emissions)	Light Liquid	0 to 25%	Annual LDAR
HV-30340	3102	Butterfly hand valve on inlet of recirculation pump	Valve (no detectable emissions)	Light Liquid	0 to 25%	Annual LDAR
XV-30267	3101	Butterfly hand valve on inlet of recirculation pump	Valve (no detectable emissions)	Light Liquid	0 to 25%	Annual LDAR
HV-60051	3088	Butterfly valve in slurry feed line to Kiln No. 1	Valve (no detectable emissions)	Light Liquid	0 to 25%	Annual LDAR

Table III.Aa-1
Equipment Subject to the Air Emission Standards for Equipment Leaks

Equipment ID No.	Monitoring Point ID	Description	Type of Equipment	Service	% Organic	Method of Compliance
FCV-60050	3089	Butterfly flow control valve in slurry feed line to Kiln No. 1	Valve (no detectable emissions)	Light Liquid	0 to 25%	Annual LDAR
HV-30291	3090	Butterfly valve on SWECO line from spool piece to SWECO	Valve (no detectable emissions)	Light Liquid	0 to 25%	Annual LDAR (when operated)
XV-30294	3091	Ball hand valve with deadman switch on SWECO line from spool piece to SWECO	Valve (no detectable emissions)	Light Liquid	0 to 25%	Annual LDAR (when operated)
2”-PS-031-18500-PS/2/ET	1003	Flange in slurry line to Tank #1 from incinerators	Flange or other connector	Light liquid	0 to 25%	LDAR as required
2”-PS-030-18500-PS/1-ET	1004-1007	Flanges in slurry line to Tank #1 from recirculation pump	Flange or other connector	Light liquid	0 to 25%	LDAR as required

Table III.Aa-1
Equipment Subject to the Air Emission Standards for Equipment Leaks

Equipment ID No.	Monitoring Point ID	Description	Type of Equipment	Service	% Organic	Method of Compliance
613-T-30079	1013	Temperature transmitter flange on Tank #1	Flange or other connector	Light liquid	0 to 25%	LDAR as required
4”-PS-033-18500-PS/2-ET	1010-1011, 1014-1016	Flanges in slurry line from Tank #1 to delivery pumps	Flange or other connector	Light liquid	0 to 25%	LDAR as required
4”-PS-033-18500-PS/2-ET	1012	Flange from flush line to slurry line from Tank #1 to delivery pumps	Flange or other connector	Light liquid	0 to 25%	LDAR as required
4”-PS-032-18500-PS/2-ET	1017-1018	Flanges in slurry line from Tank #1 to recirculation pump	Flange or other connector	Light liquid	0 to 25%	LDAR as required
2”-PS-166-18500-PS/2/ET	1022	Flange in slurry line to Tank #2 from incinerators	Flange or other connector	Light liquid	0 to 25%	LDAR as required
2”-PS-165-18500-PS/1-ET	1023-1026	Flanges in slurry line to Tank #2 from recirculation pump	Flange or other connector	Light liquid	0 to 25%	LDAR as required

Table III.Aa-1
Equipment Subject to the Air Emission Standards for Equipment Leaks

Equipment ID No.	Monitoring Point ID	Description	Type of Equipment	Service	% Organic	Method of Compliance
613-T-30164	1029	Temperature transmitter flange on Tank #2	Flange or other connector	Light liquid	0 to 25%	LDAR as required
4”-PS-168-18500-PS/2-ET	1030-1031, 1033-1035	Flanges in slurry line from Tank #2 to delivery pumps	Flange or other connector	Light liquid	0 to 25%	LDAR as required
4”-PS-168-18500-PS/2-ET	1032	Flange from flush line to slurry line from Tank #2 to delivery pumps	Flange or other connector	Light liquid	0 to 25%	LDAR as required
4”-PS-167-18500-PS/1-ET	1036-1037	Flanges in slurry line from Tank #2 to recirculation pump	Flange or other connector	Light liquid	0 to 25%	LDAR as required
2”-PS-177-18500-PS/2/ET	1041	Flange in slurry line to Tank #3 from incinerators	Flange or other connector	Light liquid	0 to 25%	LDAR as required
2”-PS-176-18500-PS/1-ET	1042-1045	Flanges in slurry line to Tank #3 from recirculation pump	Flange or other connector	Light liquid	0 to 25%	LDAR as required

Table III.Aa-1
Equipment Subject to the Air Emission Standards for Equipment Leaks

Equipment ID No.	Monitoring Point ID	Description	Type of Equipment	Service	% Organic	Method of Compliance
613-T-30197	1048	Temperature transmitter flange on Tank #3	Flange or other connector	Light liquid	0 to 25%	LDAR as required
4”-PS-179-18500-PS/2-ET	1049-1050, 1052-1054	Flanges in slurry line from Tank #3 to delivery pumps	Flange or other connector	Light liquid	0 to 25%	LDAR as required
4”-PS-179-18500-PS/2-ET	1051	Flange from flush line to slurry line from Tank #3 to delivery pumps	Flange or other connector	Light liquid	0 to 25%	LDAR as required
4”-PS-178-18500-PS/1-ET	1055-1056	Flanges in slurry line from Tank #3 to recirculation pump	Flange or other connector	Light liquid	0 to 25%	LDAR as required
2”-PS-055-18500-PS/2-ET	1057-1083. 1085-1092	Flanges in slurry line from delivery pumps to incinerators	Flange or other connector	Light liquid	0 to 25%	LDAR as required
2”-PS-055-18500-PS/2-ET	1084	Flange from flush line to slurry line from delivery pumps to incinerators	Flange or other connector	Light liquid	0 to 25%	LDAR as required

Table III.Aa-1
Equipment Subject to the Air Emission Standards for Equipment Leaks

Equipment ID No.	Monitoring Point ID	Description	Type of Equipment	Service	% Organic	Method of Compliance
4”-PL-007-18107-PF/1-ET	2007-2009	Flanges in line from makeup tank to transfer pump	Flange or other connector	Light liquid	0 to 25%	LDAR as required
4”-PL-008-18107-PF/1-ET	2010-2014	Flanges in line from transfer pump to decant tank	Flange or other connector	Light liquid	0 to 25%	LDAR as required
4”-PS-186-18500-PS/1-ET	3000	Flange in slurry line from Slurry Tank #1 to delivery pumps	Flange or other connector	Light liquid	0 to 25%	LDAR as required
4”-PS-187-18500-PS/1-ET	3001-3003	Flanges in slurry line from Slurry Tank #2 to delivery pumps	Flange or other connector	Light liquid	0 to 25%	LDAR as required
4”-PS-186-18500-PS/1-ET	3004-3005	Flanges in combined slurry line from Slurry Tanks#1 and 2 to delivery pumps	Flange or other connector	Light liquid	0 to 25%	LDAR as required
4”-PS-188-18500-PS/1-ET	3007-3009	Flanges in slurry line from Slurry Tank #3 to delivery pumps	Flange or other connector	Light liquid	0 to 25%	LDAR as required

Table III.Aa-1
Equipment Subject to the Air Emission Standards for Equipment Leaks

Equipment ID No.	Monitoring Point ID	Description	Type of Equipment	Service	% Organic	Method of Compliance
4”-PS-189-18500-PS/1-ET	3010-3013	Flanges in combined slurry line from slurry tanks to Delivery Pump #1	Flange or other connector	Light liquid	0 to 25%	LDAR as required
4”-PS-189-18500-PS/1-ET	3014-3016	Flanges in combined slurry line from slurry tanks to Delivery Pump #2	Flange or other connector	Light liquid	0 to 25%	LDAR as required
2”-PS-190-18500-PS/2-ET	3017-3018, 3020	Flanges in slurry line from Delivery Pump #1 to combined slurry line to incinerators	Flange or other connector	Light liquid	0 to 25%	LDAR as required
2”-PS-190-18500-PS/2-ET	3031-3033	Flanges in slurry line from Delivery Pump #2 to combined slurry line to incinerators	Flange or other connector	Light liquid	0 to 25%	LDAR as required
2”-PS-055-18500-PS/2-ET	3019, 3021-3030, 3034-3042	Flanges in combined slurry line from delivery pumps to incinerators	Flange or other connector	Light liquid	0 to 25%	LDAR as required

Table III.Aa-1
Equipment Subject to the Air Emission Standards for Equipment Leaks

Equipment ID No.	Monitoring Point ID	Description	Type of Equipment	Service	% Organic	Method of Compliance
2”-PS-416-18500-PS/2-ET	3043, 3048, 3049	Flanges in slurry line from recirculation pump to Tank #1	Flange or other connector	Light liquid	0 to 25%	LDAR as required
2”-PS-415-18500-PS/2-ET	3045-3047	Flanges in slurry line from recirculation pump to Tank #1	Flange or other connector	Light liquid	0 to 25%	LDAR as required
2”-PS-417-18500-PS/2-ET	3044, 3051, 3052	Flanges in slurry line from recirculation pump to Tank #2	Flange or other connector	Light liquid	0 to 25%	LDAR as required
2”-PS-438-18500-PS/2-ET	3050, 3053-3055	Flanges in slurry line from recirculation pump to Tank #3	Flange or other connector	Light liquid	0 to 25%	LDAR as required
4”-PS-439-18500-PS/1-ET	3061	Flanges in combined slurry line from tanks to recirculation pump	Flange or other connector	Light liquid	0 to 25%	LDAR as required
4”-PS-418-18500-PS/1-ET	3056-3058	Flanges in slurry line from Tank #2 to recirculation pump	Flange or other connector	Light liquid	0 to 25%	LDAR as required
4”-PS-419-18500-PS/1-ET	3059-3060, 3065	Flanges in slurry line from Tank #1 to recirculation pump	Flange or other connector	Light liquid	0 to 25%	LDAR as required

Table III.Aa-1
Equipment Subject to the Air Emission Standards for Equipment Leaks

Equipment ID No.	Monitoring Point ID	Description	Type of Equipment	Service	% Organic	Method of Compliance
4”-PS-420-18500-PS/1-ET	3062-3064	Flanges in slurry line from Tank #3 to recirculation pump	Flange or other connector	Light liquid	0 to 25%	LDAR as required
2”-PS-438-18500-PS/1-ET	3075	Blind flange to spool piece for SWECO separator system	Flange or other connector	Light liquid	0 to 25%	LDAR as required
2”-PS-202-18500	3066-3067	Flanges in SWECO line from spool piece to SWECO	Flange or other connector	Light liquid	0 to 25%	LDAR as required (when in operation)
1’-PS-055-18500-PS/2-ET	3068-3071	Flanges in slurry feed line to Kiln #1 upstream of flow control valve	Flange or other connector	Light liquid	0 to 25%	LDAR as required
1’-PS-057-18500-PS/1-ET	3072-3074	Flanges in slurry feed line to Kiln #1 downstream of flow control valve	Flange or other connector	Light liquid	0 to 25%	LDAR as required

1. Any component for which the method of compliance is shown as "LDAR as required" will be monitored within 5 days using Reference Method 21, along with other procedures set forth in 9 VAC 20-60-264; and 40 CFR §264.1063(b), if evidence of a potential leak is found by visual, audible, olfactory or any other detection method. Absent this, no set monitoring frequency is specified.
2. Note: Only those pumps, valves, and flanges and other connectors in light liquid service are identified herein. Those pumps, valves, flanges and other connectors in heavy liquid service are not subject to a routine LDAR program under Subpart BB and are therefore not assigned specific monitoring tags.

Table III.Aa-1
Equipment Subject to the Air Emission Standards for Equipment Leaks

Equipment ID No.	Monitoring Point ID	Description	Type of Equipment	Service	% Organic	Method of Compliance

However, as noted in #1 above, should a leak be observed in any of these items by visual, audible, olfactory or any other means, the leak will be documented and the device will be monitored as required.

Figure III.Aa-1 - Subpart BB Monitoring Points – Slurry Storage Tanks and Slurry Loop (DWG No. 061000-69731-F320-00)

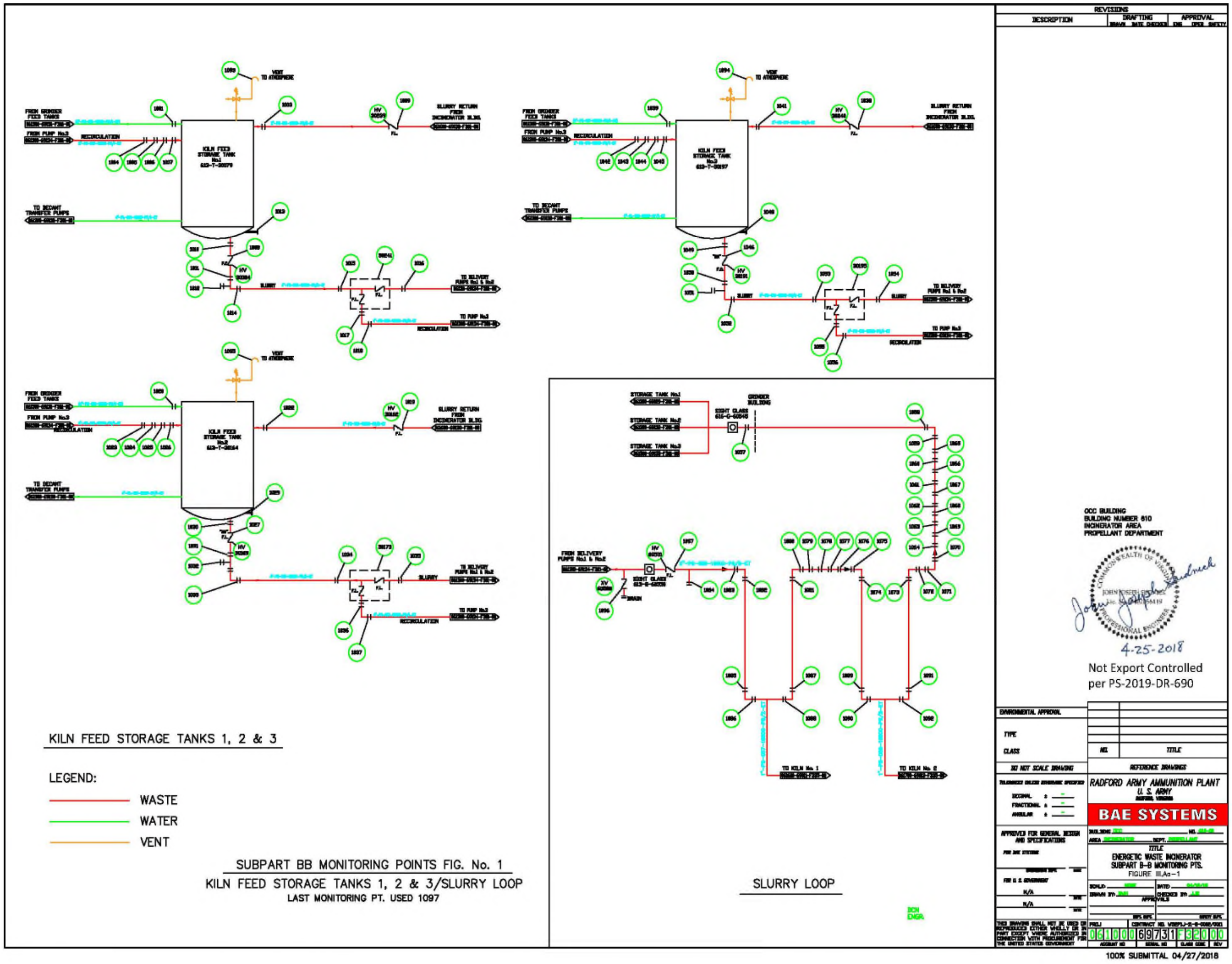


Figure III.Aa-2 - Subpart BB Monitoring Points – Makeup Water and Decant System (DWG No. 061000-69732-F320-00)

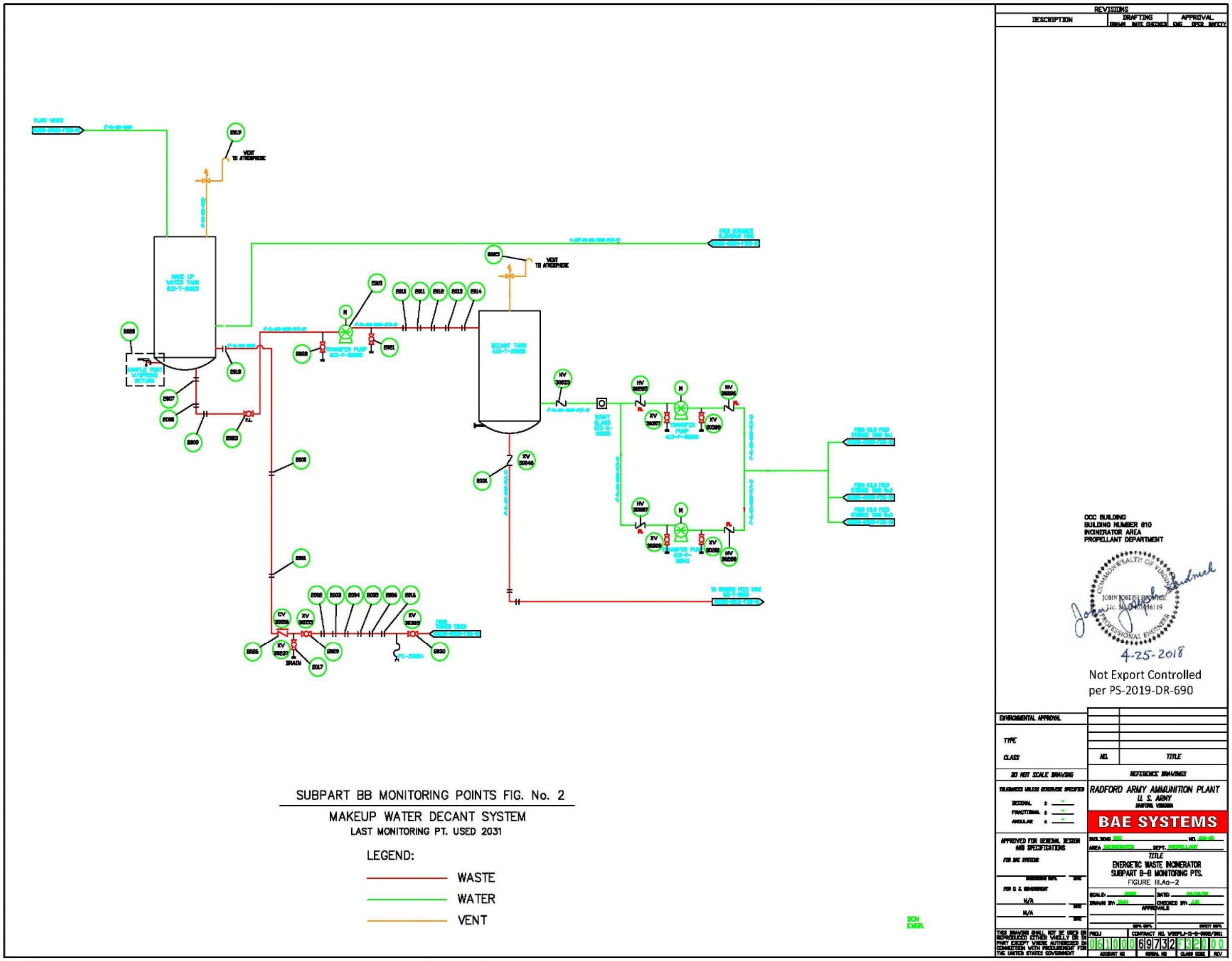
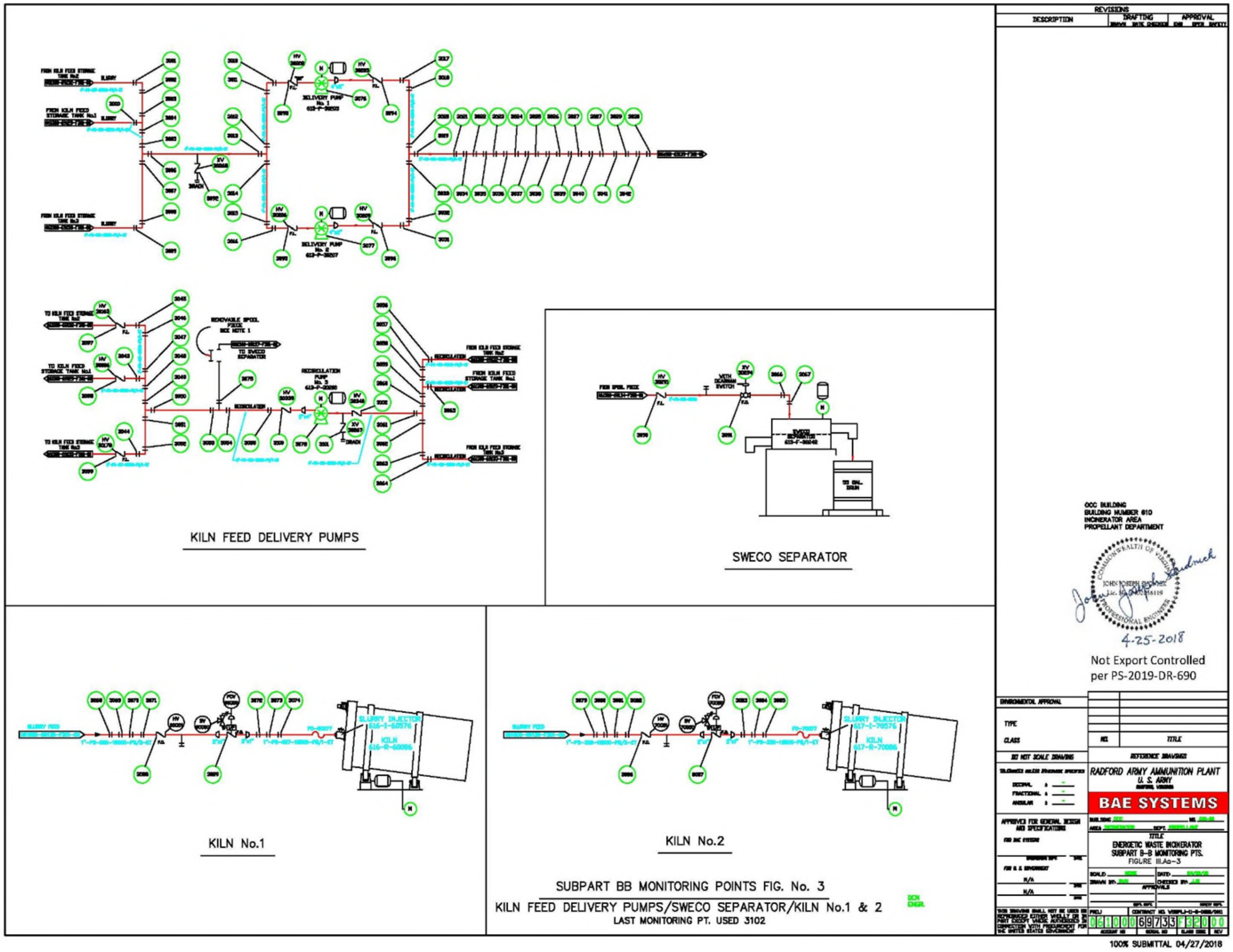


Figure III.Aa-3 - Subpart BB Monitoring Points – Kiln Feed and Recirculation System and SWECO Separator (DWG No. 061000-69733-F320-00)



Attachment III.B – Scope of Work for Report on Control Device Technologies

III.B.1. Purpose

The purpose of this report is to survey current technologies of control devices and to determine whether or not they may be safely applied to control organic air emissions from the Grinder Building, 442. This report is intended to satisfy the requirements of Permit Condition III.C.3.c.

III.B.2. Scope

The report shall cover, at minimum, the following topics:

a. Current Technologies – The report shall provide a survey of current control device technologies by type, i.e.., enclosed combustion devices, vapor recovery systems, and flares. For each technology included, the report shall discuss the relevant mechanisms of its operation (e.g., method and efficiency of organic removal, equipment requirements, operational/maintenance procedures, technology limitations, etc.) and provide drawings/diagrams, as needed.

b. DoD Explosives and Safety Standards – The report shall provide an updated list of all applicable DoD regulations, instructions, manuals, guidance's, etc., (citing specific sections, chapters, paragraphs, etc. where possible) along with a short summary of each requirement. All references used to support feasibility determinations (see Section III.B.2.e below) must be included. Such references may include documentation from qualified explosives and safety experts (however, such documentation shall be updated, as needed, taking into account current technologies and DoD standards).

c. Other Explosives and Safety Standards – The report shall provide an updated list of other (e.g., organizational requirements, industry standards, etc.) applicable regulations, instructions, manuals, guidance's, etc. along with a short summary of each requirement. All references used to support feasibility determinations (see Section III.B.2.e below) must be included. Such references may include documentation from qualified explosives and safety experts (however, such documentation shall be updated, as needed, taking into account current technologies and standards).

d. Costs – Cost estimates related to design, construction/installation, and operation of potentially viable control device technologies shall be provided. However, cost shall not be considered in the overall feasibility determination for each control device technology.

e. Feasibility Determination – The report shall provide a discussion concerning the viability of the control device technologies described in Section III.B.2.a above. This discussion shall include safety, effectiveness, and operation/maintenance considerations.

f. Emerging Technologies – The report shall provide a discussion of emerging control device technologies. This discussion shall be similar to that provided for Section III.B.2.a above.

g. Bibliography – The report shall provide a complete bibliography listing all of the references used in its development.

Attachment III.Ba - Design Specifications for Subpart CC Tank Controls for the EWI-CWP Complex

PRESSURE RELIEF SYSTEM DESIGN RECORD

Site: Radford, Va

Client:	BAE	Calculation by:	JJW
Project:	Incinerator Design	Process Lead:	JJS
Project Number:	150326C1	Original Date:	7/10/2017

System

System Name:	Kiln Feed Storage Tank No. 1		
Equipment Protected:	613-T-30079		
PRV Location:	Attached to Tank	RD Location:	
Location in Plant:	Building 613		

Identification

PRV Number:	CV-30073	RD Number:	N/A
P&ID:	613-69008	P&ID:	

Vacuum Protection

	Vacuum protection not needed	
x	Vacuum protection provided by:	Pressure/Vacuum Combination Conservation Vent

Reason for Issuance

x	New Installation (No Existing Device)	
	Modification to Existing Relief System	
	Review of Existing Installation	
	Other	

Approvals

Company:	Project Integration	Location:	Spartanburg, SC
Checked By:	AJC	Date Checked:	7/11/2017
Approvals:			
Others:			

Revision

Revision Number:	Date:	Issued For:
A	7/13/2017	Review

- Cover -Page 1 of 9

Relief Device Calculations

RV Number: CV-30073
RD Number: N/A
Calculation By: JJW

Calculation Date: 7/10/2017
Revision No.: A
Revision Date: 7/13/2017

A. System Protected

Equipment

EN #	Item Name	Design Vacuum (psig)	Design Pressure (psig)	Design Temperature (°F)	Limiting Item (X)
613-T-30079	Kiln Feed Storage Tank No. 1	-0.36	0.72	140	X

Piping

Pipe Code #	DWG #	Design Press (psig)	Design Temp (°F)	Limiting Item (X)
3"-PG-042-18301	N/A	N/A	N/A	

Drawing List

DWG #	Revision	Title
613-69008	H	Kiln Feed Storage Tank No.1 P&ID

Controlling Design Vacuum	-0.36	psig
Controlling Design Pressure	0.72	psig
Controlling Design Temperature	140	°F

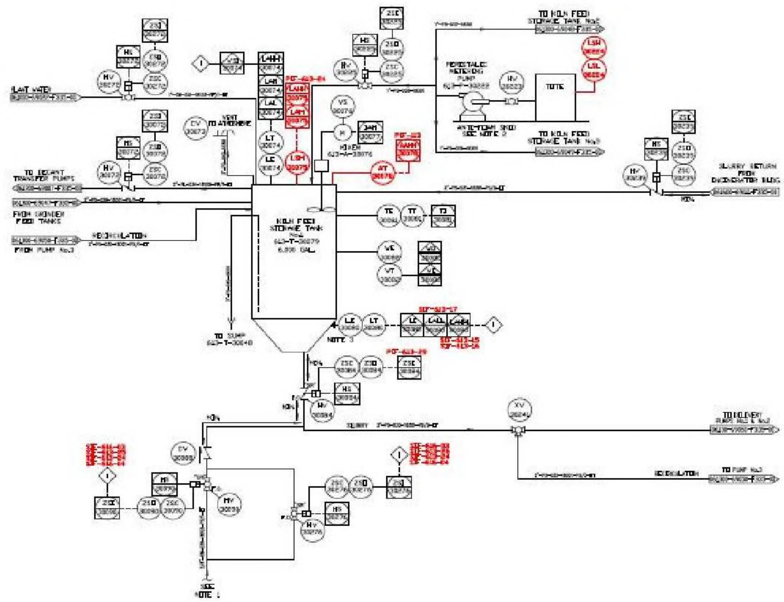
B. Configuration

Arrangement (Check appropriate application)

	Single rupture disk
x	Single pressure relief valve
	Single rupture disk upstream of single pressure relief valve
	Single rupture disk downstream of single pressure relief valve
	Other - specify

D. Schematic Drawing of System

See Equipment Drawing for Equipment Dimensions



E. System Description

Kiln Feed Storage Tank No. 1 (613-T-30079) contains a 3 to 1 slurry of water to energetic waste. Solid settling is minimized by recirculation of the tank's contents by Pump No.3 (613-P-30200). Additionally, Delivery Pumps No.1 (613-P-30203) and No.2 (613-P-30207) provide the feed to the two kilns utilizing a recirculation loop with a bleed to achieve the desired flow rate. Decant Transfer Pumps (613-P-30036, 613-P-30041) pump water from the Kiln Feed Storage Tank back to the Decant Tank (613-T-30028) to produce the desired 3 to 1 ratio of water to energetic waste. A 10 to 1 water to energetic waste slurry is delivered to the Kiln Feed Storage Tank from Grinder Feed Tanks No.1 (613-T-30103) and No.2 (613-T-30131) via Grinder Pumps (613-P-30112, 613-P-30146).

Relief Device Calculations

RV Number: CV-30073
RD Number: N/A
Calculation By: JJW

Calculation Date: 7/10/2017
Revision No.: A
Revision Date: 7/13/2017

J. Design Scenarios - In/Out-Breathing per API2000

1. **API2000**

2. **System Parameters**

Set Pressure =	0.361	psig	
Set Vacuum =	-0.180	psig	
Vessel Capacity =	6,000	gal	
Vessel Capacity =	143	bbl	Based on a 42 gal US barrel.
Vessel Contents =	Water		
T_{flash} =	n/a	°F	
T_{boil} =	212	°F	

3. **Outbreathing Fluid Composition**

Vapor Pressure =	0.336	psia	Water Vapor Pressure at 68°F
Relieving Pressure =	15.418	psia	Set Pressure + Allowable Overpressure

$$y_i = \frac{P_{vap}}{P_R}$$

Mole fraction estimated based on Dalton's Law

Mole Fraction =	0.0218	Mole fraction water
Mole Fraction =	0.9782	Mole fraction Air

4. **Inbreathing Fluid Composition**

Air

5. **Maximum Pump In Rate**

	Source	Rate (gpm)
1.	613-P-30146/30112	60.0
2.	613-P-30200	88.8
3.	613-P-30203/30207	85.8
4.		
	Total Pump In Rate =	234.6

6. **Maximum Pump Out Rate**

	Source	Rate (gpm)
1.	613-P-30203/30207	88.8
2.	613-P-30036/30041	42.0
3.		
4.		
	Total Pump Out Rate =	130.8

Relief Device Calculations

RV Number: CV-30073
RD Number: N/A
Calculation By: JJW

Calculation Date: 7/10/2017
Revision No.: A
Revision Date: 7/13/2017

J. Design Scenarios - In/Out-Breathing per API2000

7. **Liquid Movement**

Calculate out-breathing and in-breathing due to liquid movement into and out of the vessel.

7a. **4.3.2.2.1 Out-breathing.**

For nonvolatile liquids (vapor pressure ≤ 0.73 psi), the outbreathing volumetric flow rate V'op at actual pressure and temperature conditions of the tank vapor space shall be given by:

V'op = 8.02 * V'pf — where V'_{pf} is the maximum filling rate in US GPM

For volatile liquids (vapor pressure > 0.73 psi), the outbreathing volumetric flow rate V'op at actual pressure and temperature conditions of the tank vapor space shall be given by:

V'op = 16.04 * V'pf

V'_{pf} =	234.6	US GPM	Fill rate
V'_{op} =	1,881	ACFH	

7b. **4.3.2.2.2 In-breathing.**

V'ip = 8.02 * V'pe — where V'_{pe} is the maximum discharge rate in US GPM

V'_{pe} =	130.8	US GPM	Empty rate
V'_{ip} =	1,049	$SCFH_{air}$	

10. **Thermal Effects**

Calculate thermal out-breathing and in-breathing due to atmospheric heating or cooling of external surfaces of the tank's shell and roof.

10a. **4.3.2.3.2 Thermal Out-breathing.**

Calculate the thermal out-breathing (maximum thermal capacity from heating up).

$V'_{OT} = 1.51 * Y * V_{tk}^{0.9} * R_i$ where

Y is a latitude factor from Table 1 of API 2000
V_{tk} is the tank volume expressed in FT^3
R_i is an insulation reduction factor per Eqn 9 or API 2000

Y =	0.32		Latitude = 33° N
V_{tk} =	802	ft³	Volume of tank.
R_i =	1.00		

$$R_{in} = \frac{1}{1 + \frac{h * lin}{\lambda_{in}}}$$

where:
0.700 = h is the inside HTC (BTU/FT^2*HR*F)
0 = l_{in} = insulation thichkness (FT)
0.026 = λ_{in} = Thermal conductivity (BTU / FT*HR*F)

V'_{OT} =	199	$SCFH_{air}$	Thermal Out-breathing	N/A

10b. **4.3.2.3.3 Thermal In-breathing.**

Calculate the thermal in-breathing (maximum thermal capacity from cooling down).

$V'_{IT} = 3.08 * C * V_{tk}^{0.7} * R_i$ where

C is a factor from Table 2 of API 2000
V_{tk} is the tank volume expressed in FT^3
R_i is an insulation reduction factor per Eqn 9 or API 2000

C =	2.5		Factor from Table 2 of API 2000
V_{tk} =	802	ft³	Volume of tank.
R_i =	1.00		

$$R_{in} = \frac{1}{1 + \frac{h * lin}{\lambda_{in}}}$$

where:
0.700 = h is the inside HTC (BTU/FT^2*HR*F)
0 = l_{in} = insulation thichkness (FT)
0.026 = λ_{in} = Thermal conductivity (BTU / FT*HR*F)

V'_{IT} =	831	$SCFH_{air}$	Thermal In-breathing

Relief Device Calculations

RV Number: CV-30073
RD Number: N/A
Calculation By: JJW

Calculation Date: 7/10/2017
Revision No.: A
Revision Date: 7/13/2017

J. Design Scenarios - In/Out-Breathing per API2000

11. **Maintenance Error: Free Drain**

Supplemental Calculation: Free Drain, Incompressible Flow.
2" Sch40 LE, 14.5ft liquid level in 613-T-30079

	Water
V (gal/min)	251.6
P1, Tank Pressure (psig)	0.000
$d_{nominal}$ (in)	2.0
SCH	40
TOD wall (in)	N/A
L (ft)	1.0
T (°F)	68.0
Pipe Material	weld steel
$K_{fittings}$	1.5
Elevation Change (ft)	-14.5
ΔP_{other} (psi)	0
ρ (lb/ft^3)	62.43
μ (cP)	0.018
P1 (psia)	14.7
d (in)	2.0670
A (in^2)	3.356
V (ft^3/h)	2017.83
ṁ (lb/h)	125972.92
T (°C)	20.0
SG	1.0000
μ (lb/(ft*s))	1.21E-05
v̄ (ft/s)	24.05
Nre	21385252.3
ε (in)	0.00177
f, Darcy	0.01893
ΔP_{el} (psi)	-6.277
ΔP_{pipe} (psi)	6.277
ΔP_{total} (psi)	0.00
P2, Atmosphere (psig)	0.00

Relief Device Calculations

RV Number: CV-30073
RD Number: N/A
Calculation By: JJW

Calculation Date: 7/10/2017
Revision No.: A
Revision Date: 7/13/2017

J. Design Scenarios - In/Out-Breathing per API2000

12. **Summary**

Venting requirements for normal operation are the sum of the maximum liquid filling and discharge capacities plus the thermal out-breathing and in-breathing requirements.

	Required Relieving Rate		Required Relieving Rate	
Out-breathing:	2,080	SCFH	159	lb/h
In-breathing:	1,880	SCFH	143	lb/h
Free Drain:	2,018	SCFH	154	lb/h

Relief Device Calculations

RV Number: CV-30073
RD Number: N/A
Calculation By: JJW

Calculation Date: 7/10/2017
Revision: A
Revision Date: 7/13/2017

R. Outlet Pipe Sizing - Outbreathing

1. Valve Parameters:

P_{SET} =	0.361	Valve Set Pressure, psig	
OP% =	100	Allowable Overpressure, %	
P_R =	15.4	Relieving pressure at allowable overpressure, psia	
	2 x 3	Valve size, in	
CAP =	18,000	Valve capacity at allowable overpressure, scfh, air	Emerson VAREC 2020B
C factor =	1	Flow capacity modifier	C factor to be confirmed by vendor
CAP =	18,000	Valve capacity at available overpressure, scfh, air	

2. Fluid properties at relieving conditions:

M =	28.7	Molecular weight
T =	528.0	Absolute temperature at relieving conditions, R

3. Relieving Rate:

V =	2080.1	Required Relief Rate, scfh
$\dot{m}$ =	158.7	Required Relief Rate, lb/h

4. Outlet Pipe Parameters:

Entrance	0.8
90 elbow	0.3
exit	1
	2.7

$d_{nominal}$ =	3	Nominal Pipe Diameter, in
SCH =	40	Pipe Schedule
TOD wall =	N/A	TOD Wall Thickness, in
PM =	weld steel	Pipe MOC for Roughness
L =	21.42	Pipe Length, ft
K, fittings =	2.7	Cumulative Fitting Factor
Fitting Description =	1 Entrance, 3 90° Elbows, 1 Exit	
P_{MVBP} =	0	Maximum variable backpressure, psi
d_{inner} =	3.068	Inner Pipe Diameter, in
A_{pipe} =	7.39	Inner Pipe Area, in^2
ε =	0.00177	Absolute Pipe Roughness, in

5. Relieving fluid properties at the outlet of the discharge pipe (assuming isothermal model):

P_{outlet} =	14.696	psia	Atmosphere
Z_{outlet} =	1		
μ =	0.018	Viscosity, cP	
ρ_{outlet} =	0.07	Density, lb/ft^3	

$$P_{outlet} = P_{MVBP} + 14.7$$

$$Ma_2 = 1.702 \cdot 10^{-5} \left(\frac{\dot{m}}{P_{outlet} d_{inner}{}^2} \right) \sqrt{\frac{TZ}{M_w}}$$

API 521 equation (27) section 7.3.1.3.3

Ma_2 =	0.012	Isothermal outlet Mach number

6. Relieving fluid properties at the inlet of the discharge pipe (assuming isothermal model):

P_{back} =	14.70	Back Pressure, psia	CV-30073 outlet port
Z_{back} =	1		
μ_{back} =	0.018	Viscosity, cP	
ρ_{back} =	0.0745	Density, lb/ft^3	

Relief Device Calculations

RV Number: CV-30073
RD Number: N/A
Calculation By: JJW

Calculation Date: 7/10/2017
Revision: A
Revision Date: 7/13/2017

R. Outlet Pipe Sizing - Outbreathing

7. Fluid parameters at the average discharge pipe pressure:

$$\rho = \frac{P_R M_w}{10.731TZ}$$

ρ_{avg} = **0.0745** Density, lb/ft^3

μ_{avg} = **1.2095E-05** Viscosity, lb/(ft*s)

$$ACFH = \frac{\dot{m}}{\rho}$$

$ACFH_{avg}$ = **2130** Average Volumetric Flow Rate, ft^3/h

$$\bar{v} = \frac{144 \cdot ACFH}{3600 \cdot A_{Pipe}}$$

$\bar{v}_{avg}$ = **11.5** Average Velocity, ft/s

$$N_{Re} = \frac{d_{Inner}\rho\bar{v}}{12 \cdot \mu}$$

Nre = **18157** Reynolds Number

f = **0.02773** Darcy Friction Factor

Hagen-Poiseuille, Nre<2100

$$f = \frac{64}{N_{Re}}$$

f = 0.03 for critical zone, 2100<Nre<4000

$$f = \left[-2log\left\{\frac{\varepsilon/d_{inner}}{3.7065} - \frac{5.0452}{N_{Re}} log\left(\frac{\left(\varepsilon/d_{Inner}\right)^{1.1098}}{2.8257}\right) + \left(\frac{7.149}{N_{Re}}\right)^{0.8981}\right\}\right]^{-2}$$

Chen, Nre>4000

(Chen, N.H., "An Explicit Equation for Friction factor in Pipe", Ind. Eng. Chem.

8. Solve the isothermal flow equation, API 521 equation (26) section 7.3.1.3.3, for P_{back}.

$$\frac{fL}{d_{Inner}} + K_{Fittings} = \frac{1}{Ma_2{}^2}\left(\frac{P_{Back}}{P_{Outlet}}\right)^2\left[1 - \left(\frac{P_{Outlet}}{P_{Back}}\right)^2\right] - ln\left(\frac{P_{Back}}{P_{Outlet}}\right)^2$$

5.02 $= \frac{fL}{d_{Inner}} + K_{Fittings}$

5.02 $= \frac{1}{Ma_2{}^2}\left(\frac{P_{Back}}{P_{Outlet}}\right)^2\left[1 - \left(\frac{P_{Outlet}}{P_{Back}}\right)^2\right] - ln\left(\frac{P_{Back}}{P_{Outlet}}\right)^2$

0.00 **Check for convergence (Set to 0 by changing Pback in cell D66).**

P_{back} = **14.70** Back Pressure, psia

9. Check for critical flow:

$$P_{crit} = 1.702 \cdot 10^{-5}\left(\frac{\dot{m}}{d_{inner}{}^2}\right)\sqrt{\frac{TZ}{M_w}}$$

API 521 equation (30) section 7.3.1.3.3

P_{crit} = **0.2**
P_{outlet} = **14.7**

*****Sub-Critical Flow*****

10. Pressure Drop:

$$\Delta P_{Pipe} = \Delta P_{Back} - \Delta P_{Outlet}$$

ΔP pipe = **0.005365** Frictional Pressure Drop, psi

$$\Delta P_{Outlet,Total} = \Delta P_{Pipe} + \Delta P_{MVBP}$$

$\Delta P_{Outlet,total}$ = **0.005365** Total Pressure Drop, psi

PRESSURE RELIEF SYSTEM DESIGN RECORD

Site: Radford, Va

Client:	BAE	Calculation by:	JJW
Project:	Incinerator Design	Process Lead:	JJS
Project Number:	150326C1	Original Date:	7/10/2017

System

System Name:	Makeup Water Tank		
Equipment Protected:	613-T-30015		
PRV Location:	Attached to Tank	RD Location:	
Location in Plant:	Building 613		

Identification

PRV Number:	CV-30008	RD Number:	N/A
P&ID:	613-69007	P&ID:	

Vacuum Protection

[ ] Vacuum protection not needed
[x] Vacuum protection provided by: Pressure/Vacuum Combination Conservation Vent

Reason for Issuance

[x] New Installation (No Existing Device)
[ ] Modification to Existing Relief System
[ ] Review of Existing Installation
[ ] Other

Approvals

Company:	Project Integration	Location:	Spartanburg, SC
Checked By:	AJC	Date Checked:	7/11/2017
Approvals:			
Others:			

Revision

Revision Number:	Date:	Issued For:
A	7/14/2017	Review

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Relief Device Calculations

RV Number: CV-30008
RD Number: N/A
Calculation By: JJW

Calculation Date: 7/10/2017
Revision No.: A
Revision Date: 7/14/2017

A. System Protected

Equipment

EN #	Item Name	Design Vacuum (psig)	Design Pressure (psig)	Design Temperature (°F)	Limiting Item (X)
613-T-30015	Makeup Water Tank	-0.36	0.72	140	X

Piping

Pipe Code #	DWG #	Design Press (psig)	Design Temp (°F)	Limiting Item (X)
3"-PG-005-18301	N/A	N/A	N/A	

Drawing List

DWG #	Revision	Title
613-69007	K	Makeup Water Decant System P&ID

Controlling Design Vacuum	-0.36	psig
Controlling Design Pressure	0.72	psig
Controlling Design Temperature	140	°F

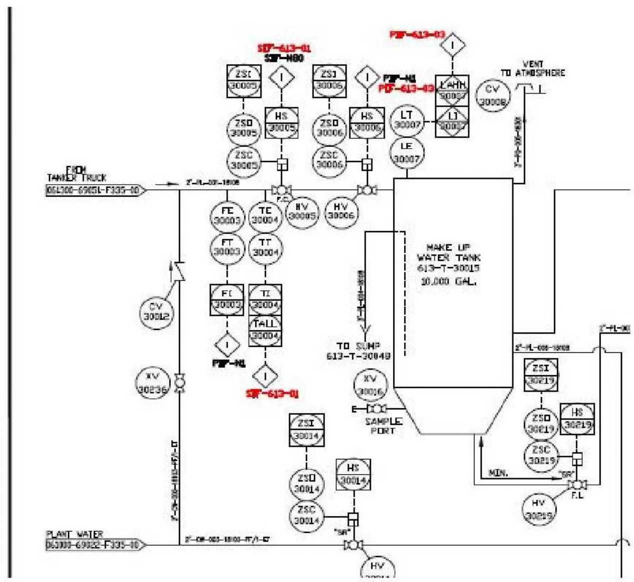
B. Configuration

Arrangement (Check appropriate application)

	Single rupture disk
x	Single pressure relief valve
	Single rupture disk upstream of single pressure relief valve
	Single rupture disk downstream of single pressure relief valve
	Other - specify

D. Schematic Drawing of System

See Equipment Drawing for Equipment Dimensions



E. System Description

The Makeup Water Tank (613-T-30015) provides water to the Decant Tank (613-T-30028) in the Grinder Building, Building 613, via pump 613-P-30220. The primary feed to the tank comes from the Plant Water Supply and a recycle stream from the Scrubber Blowdown Tank (616-T-60400) through Blowdown Pump (616-P-60403). Additionally, water will be intermittently supplied from Tanker Trucks through Dual Diaphragm Pump (613-P-30218) and Secondary Containment Water Storage Tanks No. 1-3 through Dual Diaphragm pump (613-P-30051).

Relief Device Calculations

RV Number: CV-30008
RD Number: N/A
Calculation By: JJW

Calculation Date: 7/10/2017
Revision No.: A
Revision Date: 7/14/2017

J. Design Scenarios - In/Out-Breathing per API2000

1. **API2000**

2. **System Parameters**

Set Pressure =	0.361	psig	
Set Vacuum =	-0.180	psig	
Vessel Capacity =	10,000	gal	
Vessel Capacity =	238	bbl	Based on a 42 gal US barrel.
Vessel Contents =	Water		
T_{flash} =	n/a	°F	
T_{boil} =	212	°F	

3. **Outbreathing Fluid Composition**

Vapor Pressure =	0.336	psia	Water Vapor Pressure at 68°F
Relieving Pressure =	15.418	psia	Set Pressure + Allowable Overpressure

$$y_i = \frac{P_{vap}}{P_R}$$

Mole fraction estimated based on Dalton's Law

Mole Fraction =	0.0218	Mole fraction water
Mole Fraction =	0.9782	Mole fraction Air

4. **Inbreathing Fluid Composition**

Air

5. **Maximum Pump In Rate**

	Source	Rate (gpm)
1.	613-P-30051	70.0
2.	Plant Water	80.0
3.	616-P-60403	70.0
4.	616-P-30218	70.0
	Total Pump In Rate =	290.0

6. **Maximum Pump Out Rate**

	Source	Rate (gpm)
1.	613-P-30220	44.0
2.		
3.		
4.		
	Total Pump Out Rate =	44.0

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Relief Device Calculations

RV Number: CV-30008
RD Number: N/A
Calculation By: JJW

Calculation Date: 7/10/2017
Revision No.: A
Revision Date: 7/14/2017

J. Design Scenarios - In/Out-Breathing per API2000

7. **Liquid Movement**

Calculate out-breathing and in-breathing due to liquid movement into and out of the vessel.

7a. **4.3.2.2.1 Out-breathing.**

For nonvolatile liquids (vapor pressure ≤ 0.73 psi), the outbreathing volumetric flow rate V'op at actual pressure and temperature conditions of the tank vapor space shall be given by:

V'op = 8.02 * V'pf — where V'_{pf} is the maximum filling rate in US GPM

For volatile liquids (vapor pressure > 0.73 psi), the outbreathing volumetric flow rate V'op at actual pressure and temperature conditions of the tank vapor space shall be given by:

V'op = 16.04 * V'pf

V'_{pf} =	290.0	US GPM	Fill rate
V'_{op} =	2,326	ACFH	

7b. **4.3.2.2.2 In-breathing.**

V'ip = 8.02 * V'pe — where V'_{pe} is the maximum discharge rate in US GPM

V'_{pe} =	44.0	US GPM	Empty rate
V'_{ip} =	353	$SCFH_{air}$	

10. **Thermal Effects**

Calculate thermal out-breathing and in-breathing due to atmospheric heating or cooling of external surfaces of the tank's shell and roof.

10a. **4.3.2.3.2 Thermal Out-breathing.**

Calculate the thermal out-breathing (maximum thermal capacity from heating up).

$V'_{OT} = 1.51 * Y * V_{tk}^{0.9} * R_i$ where

Y is a latitude factor from Table 1 of API 2000
V_{tk} is the tank volume expressed in FT^3
R_i is an insulation reduction factor per Eqn 9 or API 2000

Y =	0.32		Latitude = 33° N
V_{tk} =	1,337	ft^3	Volume of tank.
R_i =	1.00	$R_{in} = \frac{1}{1+\frac{h*lin}{\lambda_{in}}}$	

where:
0.700 = h is the inside HTC (BTU/FT^2*HR*F)
0 = l_{in} = insulation thichkness (FT)
0.026 = λ_{in} = Thermal conductivity (BTU / FT*HR*F)

V'_{OT} =	314	$SCFH_{air}$	Thermal Out-breathing	N/A

10b. **4.3.2.3.3 Thermal In-breathing.**

Calculate the thermal in-breathing (maximum thermal capacity from cooling down).

$V'_{IT} = 3.08 * C * V_{tk}^{0.7} * R_i$ where

C is a factor from Table 2 of API 2000
V_{tk} is the tank volume expressed in FT^3
R_i is an insulation reduction factor per Eqn 9 or API 2000

C =	2.5		Factor from Table 2 of API 2000
V_{tk} =	1,337	ft^3	Volume of tank.
R_i =	1.00	$R_{in} = \frac{1}{1+\frac{h*lin}{\lambda_{in}}}$	

where:
0.700 = h is the inside HTC (BTU/FT^2*HR*F)
0 = l_{in} = insulation thichkness (FT)
0.026 = λ_{in} = Thermal conductivity (BTU / FT*HR*F)

V'_{IT} =	1,188	$SCFH_{air}$	Thermal In-breathing

Relief Device Calculations

RV Number: CV-30008
RD Number: N/A
Calculation By: JJW

Calculation Date: 7/10/2017
Revision No.: A
Revision Date: 7/14/2017

J. Design Scenarios - In/Out-Breathing per API2000

11. **Maintenance Error: Free Drain**

Supplemental Calculation: Free Drain, Incompressible Flow.
2" Sch40 Line, 23ft liquid level in 613-T-30015

	Water
V (gal/min)	316.8
P1, Tank Pressure (psig)	0.000
$d_{nominal}$ (in)	2.0
SCH	40
TOD wall (in)	N/A
L (ft)	1.0
T (°F)	68.0
Pipe Material	weld steel
$K_{fittings}$	1.5
Elevation Change (ft)	-23.0
ΔP_{other} (psi)	0
ρ (lb/ft^3)	62.43
μ (cP)	0.018
P1 (psia)	14.7
d (in)	2.0670
A (in^2)	3.356
V (ft^3/h)	2541.37
ṁ (lb/h)	158657.65
T (°C)	20.0
SG	1.0000
μ (lb/(ft*s))	1.21E-05
v̄ (ft/s)	30.29
Nre	26933834.4
ε (in)	0.00177
f, Darcy	0.01892
ΔP_{el} (psi)	-9.957
ΔP_{pipe} (psi)	9.957
ΔP_{total} (psi)	0.00
P2, Atmosphere (psig)	0.00

- CV API2000 -Page 6 of 9

Relief Device Calculations

RV Number: CV-30008
RD Number: N/A
Calculation By: JJW

Calculation Date: 7/10/2017
Revision No.: A
Revision Date: 7/14/2017

J. Design Scenarios - In/Out-Breathing per API2000

12. **Summary**

Venting requirements for normal operation are the sum of the maximum liquid filling and discharge capacities plus the thermal out-breathing and in-breathing requirements.

	Required Relieving Rate		Required Relieving Rate	
Out-breathing:	2,640	SCFH	202	lb/h
In-breathing:	1,541	SCFH	118	lb/h
Free Drain:	2,541	SCFH	194	lb/h

Relief Device Calculations

RV Number: CV-30008
RD Number: N/A
Calculation By: JJW

Calculation Date: 7/10/2017
Revision: A
Revision Date: 7/14/2017

R. Outlet Pipe Sizing - Outbreathing

1. Valve Parameters:

P_{SET} =	0.361	Valve Set Pressure, psig	
OP% =	100	Allowable Overpressure, %	
P_R =	15.4	Relieving pressure at allowable overpressure, psia	
	2 x 3	Valve size, in	
CAP =	18,000	Valve capacity at allowable overpressure, scfh, air	Emerson VAREC 2020B
C factor =	1	Flow capacity modifier	C factor to be confirmed by vendor
CAP =	18,000	Valve capacity at available overpressure, scfh, air	

2. Fluid properties at relieving conditions:

M =	28.7	Molecular weight
T =	528.0	Absolute temperature at relieving conditions, R

3. Relieving Rate:

V =	2640.3	Required Relief Rate, scfh
$\dot{m}$ =	201.5	Required Relief Rate, lb/h

4. Outlet Pipe Parameters:

Entrance	0.8
90 elbow	0.3
exit	1
	2.7

$d_{nominal}$ =	3	Nominal Pipe Diameter, in
SCH =	40	Pipe Schedule
TOD wall =	N/A	TOD Wall Thickness, in
PM =	weld steel	Pipe MOC for Roughness
L =	21.42	Pipe Length, ft
K, fittings =	2.7	Cumulative Fitting Factor
Fitting Description =	1 Entrance, 3 90° Elbows, 1 Exit	
P_{MVBP} =	0	Maximum variable backpressure, psi
d_{inner} =	3.068	Inner Pipe Diameter, in
A_{pipe} =	7.39	Inner Pipe Area, in^2
ε =	0.00177	Absolute Pipe Roughness, in

5. Relieving fluid properties at the outlet of the discharge pipe (assuming isothermal model):

P_{outlet} =	14.696	psia	Atmosphere
Z_{outlet} =	1		
μ =	0.018	Viscosity, cP	
ρ_{outlet} =	0.07	Density, lb/ft^3	

$$P_{outlet} = P_{MVBP} + 14.7$$

$$Ma_2 = 1.702 \cdot 10^{-5} \left(\frac{\dot{m}}{P_{outlet} d_{inner}{}^2} \right) \sqrt{\frac{TZ}{M_w}}$$

API 521 equation (27) section 7.3.1.3.3

Ma_2 =	0.015	Isothermal outlet Mach number

6. Relieving fluid properties at the inlet of the discharge pipe (assuming isothermal model):

P_{back} =	14.70	Back Pressure, psia	CV-30008 outlet port
Z_{back} =	1		
μ_{back} =	0.018	Viscosity, cP	
ρ_{back} =	0.0746	Density, lb/ft^3	

Relief Device Calculations

RV Number: CV-30008
RD Number: N/A
Calculation By: JJW

Calculation Date: 7/10/2017
Revision: A
Revision Date: 7/14/2017

R. Outlet Pipe Sizing - Outbreathing

7. Fluid parameters at the average discharge pipe pressure:

$$\rho = \frac{P_R M_w}{10.731TZ}$$

ρ_{avg} = **0.0745** Density, lb/ft^3

μ_{avg} = **1.2095E-05** Viscosity, lb/(ft*s)

$$ACFH = \frac{\dot{m}}{\rho}$$

$ACFH_{avg}$ = **2703** Average Volumetric Flow Rate, ft^3/h

$$\bar{v} = \frac{144 \cdot ACFH}{3600 \cdot A_{Pipe}}$$

$\bar{v}_{avg}$ = **14.6** Average Velocity, ft/s

$$N_{Re} = \frac{d_{Inner}\rho\bar{v}}{12 \cdot \mu}$$

Nre = **23047** Reynolds Number

f = **0.02637** Darcy Friction Factor

Hagen-Poiseuille, Nre<2100

$$f = \frac{64}{N_{Re}}$$

f = 0.03 for critical zone, 2100<Nre<4000

$$f = \left[-2log\left\{\frac{\varepsilon/d_{inner}}{3.7065} - \frac{5.0452}{N_{Re}} log\left(\frac{\left(\varepsilon/d_{Inner}\right)^{1.1098}}{2.8257}\right) + \left(\frac{7.149}{N_{Re}}\right)^{0.8981}\right\}\right]^{-2}$$

Chen, Nre>4000
(Chen, N.H., "An Explicit Equation for Friction factor in Pipe", Ind. Eng. Chem.

8. Solve the isothermal flow equation, API 521 equation (26) section 7.3.1.3.3, for P_{back}.

$$\frac{fL}{d_{Inner}} + K_{Fittings} = \frac{1}{Ma_2{}^2}\left(\frac{P_{Back}}{P_{Outlet}}\right)^2\left[1-\left(\frac{P_{Outlet}}{P_{Back}}\right)^2\right] - ln\left(\frac{P_{Back}}{P_{Outlet}}\right)^2$$

4.91 $= \frac{fL}{d_{Inner}} + K_{Fittings}$

4.91 $= \frac{1}{Ma_2{}^2}\left(\frac{P_{Back}}{P_{Outlet}}\right)^2\left[1-\left(\frac{P_{Outlet}}{P_{Back}}\right)^2\right] - ln\left(\frac{P_{Back}}{P_{Outlet}}\right)^2$

0.00 **Check for convergence (Set to 0 by changing Pback in cell D66).**

P_{back} = **14.70** Back Pressure, psia

9. Check for critical flow:

$$P_{crit} = 1.702 \cdot 10^{-5}\left(\frac{\dot{m}}{d_{inner}{}^2}\right)\sqrt{\frac{TZ}{M_w}}$$

API 521 equation (30) section 7.3.1.3.3

P_{crit} = **0.2**
P_{outlet} = **14.7**

*****Sub-Critical Flow*****

10. Pressure Drop:

$$\Delta P_{Pipe} = \Delta P_{Back} - \Delta P_{Outlet}$$

ΔP pipe = **0.008449** Frictional Pressure Drop, psi

$$\Delta P_{Outlet,Total} = \Delta P_{Pipe} + \Delta P_{MVBP}$$

$\Delta P_{Outlet,total}$ = **0.008449** Total Pressure Drop, psi

PRESSURE RELIEF SYSTEM DESIGN RECORD

Site: Radford, Va

Client:	BAE	Calculation by:	JJW
Project:	Incinerator Design	Process Lead:	JJS
Project Number:	150326C1	Original Date:	7/10/2017

System

System Name:	Decant Tank		
Equipment Protected:	613-T-30028		
PRV Location:	Attached to Tank	RD Location:	
Location in Plant:	Building 613		

Identification

PRV Number:	CV-30029	RD Number:	N/A
P&ID:	613-69007	P&ID:	

Vacuum Protection

	Vacuum protection not needed	
x	Vacuum protection provided by:	Pressure/Vacuum Combination Conservation Vent

Reason for Issuance

x	New Installation (No Existing Device)
	Modification to Existing Relief System
	Review of Existing Installation
	Other

Approvals

Company:	Project Integration	Location:	Spartanburg, SC
Checked By:	AJC	Date Checked:	7/11/2017
Approvals:			
Others:			

Revision

Revision Number:		Date:		Issued For:
	A		7/14/2017	Review

Relief Device Calculations

RV Number: CV-30029
RD Number: N/A
Calculation By: JJW

Calculation Date: 7/10/2017
Revision No.: A
Revision Date: 7/14/2017

A. System Protected

Equipment

EN #	Item Name	Design Vacuum (psig)	Design Pressure (psig)	Design Temperature (°F)	Limiting Item (X)
613-T-30028	Decant Tank	-0.36	0.72	140	X

Piping

Pipe Code #	DWG #	Design Press (psig)	Design Temp (°F)	Limiting Item (X)
3"-PG-010-18301	N/A	N/A	N/A	

Drawing List

DWG #	Revision	Title
613-69007	K	Makeup Water Decant System P&ID

Controlling Design Vacuum	-0.36	psig
Controlling Design Pressure	0.72	psig
Controlling Design Temperature	140	°F

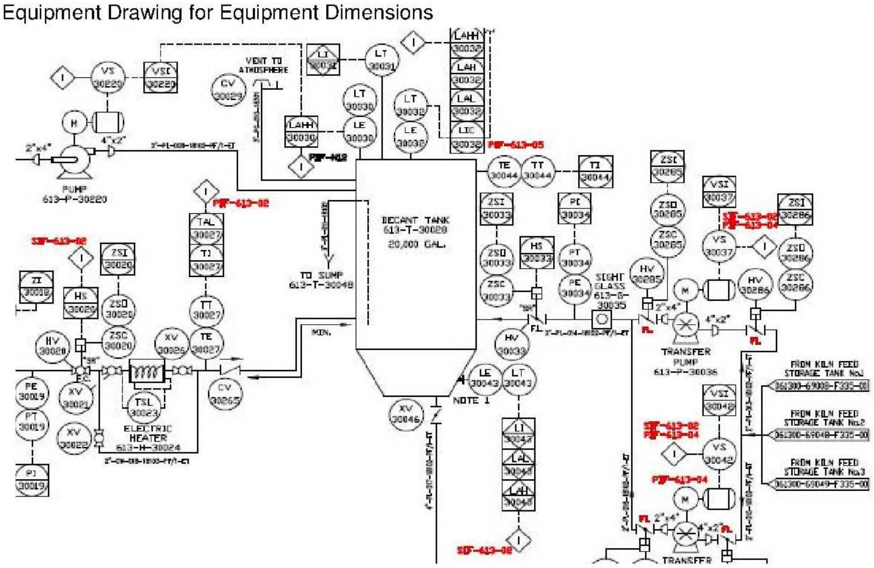
B. Configuration

Arrangement (Check appropriate application)

	Single rupture disk
x	Single pressure relief valve
	Single rupture disk upstream of single pressure relief valve
	Single rupture disk downstream of single pressure relief valve
	Other - specify

D. Schematic Drawing of System

See Equipment Drawing for Equipment Dimensions



E. System Description

Decant Tank (613-T-30028) provides water to Grinder Feed Tanks No.1 (613-T-30103) and No.2 (613-T-30131) such that a 10 to 1 ratio of water to Energetic Waste is produced in the Grinder Feed Tanks. The flow is provided by the hydrostatic pressure head produced by the elevation of the Decant Tank. Feed to the Decant Tank is provided by Plant Water and supply pumped from the Makeup Water Tank (613-T-30015) through Pump (613-P-30220). Addtionally, water decanted from Kiln Feed Storage Tanks No. 1-3 (613-T-30079, 613-T-30164, 613-T-30197) is transfered to the Decant Tank via Transfer Pumps (613-P-30036, 613-P-30041). The water is pumped out of the Kiln Feed Storage Tanks to produce a 3 to 1 water to energetic waste ratio to be fed to the kilns.

Relief Device Calculations

RV Number: CV-30029
RD Number: N/A
Calculation By: JJW

Calculation Date: 7/10/2017
Revision No.: A
Revision Date: 7/14/2017

J. Design Scenarios - In/Out-Breathing per API2000

1. **API2000**

2. **System Parameters**

Set Pressure =	0.361	psig	
Set Vacuum =	-0.180	psig	
Vessel Capacity =	12,500	gal	
Vessel Capacity =	298	bbl	Based on a 42 gal US barrel.
Vessel Contents =	Water		
T_{flash} =	n/a	°F	
T_{boil} =	212	°F	

3. **Outbreathing Fluid Composition**

Vapor Pressure =	0.336	psia	Water Vapor Pressure at 68°F
Relieving Pressure =	15.418	psia	Set Pressure + Allowable Overpressure
$y_i = \frac{P_{vap}}{P_R}$			Mole fraction estimated based on Dalton's Law
Mole Fraction =	0.0218		Mole fraction water
Mole Fraction =	0.9782		Mole fraction Air

4. **Inbreathing Fluid Composition**

Air

5. **Maximum Pump In Rate**

	Source	Rate (gpm)
1.	613-P-30220	44.0
2.	Plant Water	80.0
3.	613-P-30036/30041	42.0
4.		
	Total Pump In Rate =	166.0

6. **Maximum Pump Out Rate**

	Source	Rate (gpm)
1.		480.0
2.	Hydrostatic Pressure Flow	
3.	to Grinder Feed Tanks	
4.		
	Total Pump Out Rate =	480.0

- CV API2000 -Page 4 of 9

Relief Device Calculations

RV Number: CV-30029
RD Number: N/A
Calculation By: JJW

Calculation Date: 7/10/2017
Revision No.: A
Revision Date: 7/14/2017

J. Design Scenarios - In/Out-Breathing per API2000

7. **Liquid Movement**

Calculate out-breathing and in-breathing due to liquid movement into and out of the vessel.

7a. **4.3.2.2.1 Out-breathing.**

For nonvolatile liquids (vapor pressure ≤ 0.73 psi), the outbreathing volumetric flow rate V'op at actual pressure and temperature conditions of the tank vapor space shall be given by:

V'op = 8.02 * V'pf — where V'_{pf} is the maximum filling rate in US GPM

For volatile liquids (vapor pressure > 0.73 psi), the outbreathing volumetric flow rate V'op at actual pressure and temperature conditions of the tank vapor space shall be given by:

V'op = 16.04 * V'pf

V'_{pf} =	166.0	US GPM	Fill rate
V'_{op} =	1,331	ACFH	

7b. **4.3.2.2.2 In-breathing.**

V'ip = 8.02 * V'pe — where V'_{pe} is the maximum discharge rate in US GPM

V'_{pe} =	480.0	US GPM	Empty rate
V'_{ip} =	3,850	$SCFH_{air}$	

10. **Thermal Effects**

Calculate thermal out-breathing and in-breathing due to atmospheric heating or cooling of external surfaces of the tank's shell and roof.

10a. **4.3.2.3.2 Thermal Out-breathing.**

Calculate the thermal out-breathing (maximum thermal capacity from heating up).

$V'_{OT} = 1.51 * Y * V_{tk}^{0.9} * R_i$ where

Y is a latitude factor from Table 1 of API 2000
V_{tk} is the tank volume expressed in FT^3
R_i is an insulation reduction factor per Eqn 9 or API 2000

Y =	0.32		Latitude = 33° N
V_{tk} =	1,671	ft³	Volume of tank.
R_i =	1.00	$R_{in} = \frac{1}{1+\frac{h*lin}{\lambda_{in}}}$	where: 0.700 = h is the inside HTC (BTU/FT^2*HR*F); 0 = l_{in} = insulation thichkness (FT); 0.026 = λ_{in} = Thermal conductivity (BTU / FT*HR*F)
V'_{OT} =	384	$SCFH_{air}$	Thermal Out-breathing N/A

10b. **4.3.2.3.3 Thermal In-breathing.**

Calculate the thermal in-breathing (maximum thermal capacity from cooling down).

$V'_{IT} = 3.08 * C * V_{tk}^{0.7} * R_i$ where

C is a factor from Table 2 of API 2000
V_{tk} is the tank volume expressed in FT^3
R_i is an insulation reduction factor per Eqn 9 or API 2000

C =	2.5		Factor from Table 2 of API 2000
V_{tk} =	1,671	ft³	Volume of tank.
R_i =	1.00	$R_{in} = \frac{1}{1+\frac{h*lin}{\lambda_{in}}}$	where: 0.700 = h is the inside HTC (BTU/FT^2*HR*F); 0 = l_{in} = insulation thichkness (FT); 0.026 = λ_{in} = Thermal conductivity (BTU / FT*HR*F)
V'_{IT} =	1,389	$SCFH_{air}$	Thermal In-breathing

Relief Device Calculations

RV Number: CV-30029
RD Number: N/A
Calculation By: JJW

Calculation Date: 7/10/2017
Revision No.: A
Revision Date: 7/14/2017

J. Design Scenarios - In/Out-Breathing per API2000

11. **Maintenance Error: Free Drain**

Supplemental Calculation: Free Drain, Incompressible Flow.
2" Sch40 Line, 12ft liquid level in 613-T-30028

	Water
V (gal/min)	228.9
P1, Tank Pressure (psig)	0.000
$d_{nominal}$ (in)	2.0
SCH	40
TOD wall (in)	N/A
L (ft)	1.0
T (°F)	68.0
Pipe Material	weld steel
$K_{fittings}$	1.5
Elevation Change (ft)	-12.0
ΔP_{other} (psi)	0
ρ (lb/ft^3)	62.43
μ (cP)	0.018
P1 (psia)	14.7
d (in)	2.0670
A (in^2)	3.356
V (ft^3/h)	1835.75
ṁ (lb/h)	114606.02
T (°C)	20.0
SG	1.0000
μ (lb/(ft*s))	1.21E-05
v̄ (ft/s)	21.88
Nre	19455600.0
ε (in)	0.00177
f, Darcy	0.01893
ΔP_{el} (psi)	-5.195
ΔP_{pipe} (psi)	5.195
ΔP_{total} (psi)	0.00
P2, Atmosphere (psig)	0.00

Relief Device Calculations

RV Number: CV-30029
RD Number: N/A
Calculation By: JJW

Calculation Date: 7/10/2017
Revision No.: A
Revision Date: 7/14/2017

J. Design Scenarios - In/Out-Breathing per API2000

12. **Summary**

Venting requirements for normal operation are the sum of the maximum liquid filling and discharge capacities plus the thermal out-breathing and in-breathing requirements.

	Required Relieving Rate		Required Relieving Rate	
Out-breathing:	1,716	SCFH	131	lb/h
In-breathing:	5,238	SCFH	400	lb/h
Free Drain:	1,836	SCFH	140	lb/h

Relief Device Calculations

RV Number: CV-30029
RD Number: N/A
Calculation By: JJW

Calculation Date: 7/10/2017
Revision: A
Revision Date: 7/14/2017

R. Outlet Pipe Sizing - Outbreathing

1. Valve Parameters:

P_{SET} =	0.361	Valve Set Pressure, psig	
OP% =	100	Allowable Overpressure, %	
P_R =	15.4	Relieving pressure at allowable overpressure, psia	
	2 x 3	Valve size, in	
CAP =	18,000	Valve capacity at allowable overpressure, scfh, air	Emerson VAREC 2020B
C factor =	1	Flow capacity modifier	C factor to be confirmed by vendor
CAP =	18,000	Valve capacity at available overpressure, scfh, air	

2. Fluid properties at relieving conditions:

M =	28.7	Molecular weight
T =	528.0	Absolute temperature at relieving conditions, R

3. Relieving Rate:

V =	1715.8	Required Relief Rate, scfh
$\dot{m}$ =	130.9	Required Relief Rate, lb/h

4. Outlet Pipe Parameters:

$d_{nominal}$ =	3	Nominal Pipe Diameter, in
SCH =	40	Pipe Schedule
TOD wall =	N/A	TOD Wall Thickness, in
PM =	weld steel	Pipe MOC for Roughness
L =	21.42	Pipe Length, ft
K, fittings =	2.7	Cumulative Fitting Factor
Fitting Description =	1 Entrance, 3 90° Elbows, 1 Exit	
P_{MVBP} =	0	Maximum variable backpressure, psi
d_{inner} =	3.068	Inner Pipe Diameter, in
A_{pipe} =	7.39	Inner Pipe Area, in^2
ε =	0.00177	Absolute Pipe Roughness, in

Entrance	0.8
90 elbow	0.3
exit	1
	2.7

5. Relieving fluid properties at the outlet of the discharge pipe (assuming isothermal model):

P_{outlet} =	14.696	psia	Atmosphere
Z_{outlet} =	1		
μ =	0.018	Viscosity, cP	
ρ_{outlet} =	0.07	Density, lb/ft^3	

$$P_{outlet} = P_{MVBP} + 14.7$$

$$Ma_2 = 1.702 \cdot 10^{-5}\left(\frac{\dot{m}}{P_{outlet} {d_{inner}}^2}\right)\sqrt{\frac{TZ}{M_w}}$$

API 521 equation (27) section 7.3.1.3.3

Ma_2 = 0.010 Isothermal outlet Mach number

6. Relieving fluid properties at the inlet of the discharge pipe (assuming isothermal model):

P_{back} =	14.70	Back Pressure, psia	CV-30029 outlet port
Z_{back} =	1		
μ_{back} =	0.018	Viscosity, cP	
ρ_{back} =	0.0745	Density, lb/ft^3	

Relief Device Calculations

RV Number: CV-30029
RD Number: N/A
Calculation By: JJW

Calculation Date: 7/10/2017
Revision: A
Revision Date: 7/14/2017

R. Outlet Pipe Sizing - Outbreathing

7. Fluid parameters at the average discharge pipe pressure:

$$\rho = \frac{P_R M_w}{10.731TZ}$$

ρ_{avg} = **0.0745** Density, lb/ft^3

μ_{avg} = **1.2095E-05** Viscosity, lb/(ft*s)

$$ACFH = \frac{\dot{m}}{\rho}$$

$ACFH_{avg}$ = **1757** Average Volumetric Flow Rate, ft^3/h

$$\bar{v} = \frac{144 \cdot ACFH}{3600 \cdot A_{Pipe}}$$

$\bar{v}_{avg}$ = **9.5** Average Velocity, ft/s

$$N_{Re} = \frac{d_{Inner}\rho\bar{v}}{12 \cdot \mu}$$

Nre = **14977** Reynolds Number

f = **0.02893** Darcy Friction Factor

Hagen-Poiseuille, Nre<2100

$$f = \frac{64}{N_{Re}}$$

f = 0.03 for critical zone, 2100<Nre<4000

$$f = \left[-2log\left\{\frac{\varepsilon/d_{inner}}{3.7065} - \frac{5.0452}{N_{Re}}log\left(\frac{\left(\varepsilon/d_{Inner}\right)^{1.1098}}{2.8257}\right) + \left(\frac{7.149}{N_{Re}}\right)^{0.8981}\right\}\right]^{-2}$$

Chen, Nre>4000
(Chen, N.H., "An Explicit Equation for Friction factor in Pipe", Ind. Eng. Chem.

8. Solve the isothermal flow equation, API 521 equation (26) section 7.3.1.3.3, for P_{back}.

$$\frac{fL}{d_{Inner}} + K_{Fittings} = \frac{1}{Ma_2{}^2}\left(\frac{P_{Back}}{P_{Outlet}}\right)^2\left[1 - \left(\frac{P_{Outlet}}{P_{Back}}\right)^2\right] - ln\left(\frac{P_{Back}}{P_{Outlet}}\right)^2$$

5.12 $= \frac{fL}{d_{Inner}} + K_{Fittings}$

5.12 $= \frac{1}{Ma_2{}^2}\left(\frac{P_{Back}}{P_{Outlet}}\right)^2\left[1 - \left(\frac{P_{Outlet}}{P_{Back}}\right)^2\right] - ln\left(\frac{P_{Back}}{P_{Outlet}}\right)^2$

0.00 **Check for convergence (Set to 0 by changing Pback in cell D66).**

P_{back} = **14.70** Back Pressure, psia

9. Check for critical flow:

$$P_{crit} = 1.702 \cdot 10^{-5}\left(\frac{\dot{m}}{d_{inner}{}^2}\right)\sqrt{\frac{TZ}{M_w}}$$

API 521 equation (30) section 7.3.1.3.3

P_{crit} = **0.1**
P_{outlet} = **14.7**

*****Sub-Critical Flow*****

10. Pressure Drop:

$$\Delta P_{Pipe} = \Delta P_{Back} - \Delta P_{Outlet}$$

ΔP pipe = **0.003724** Frictional Pressure Drop, psi

$$\Delta P_{Outlet,Total} = \Delta P_{Pipe} + \Delta P_{MVBP}$$

$\Delta P_{Outlet,total}$ = **0.003724** Total Pressure Drop, psi

Module IV - Storage/Treatment in Tanks for the EWI and EWI-CWP

IV.A. PERMITTED WASTES - EWI

IV.A.1 Subject to the terms of this Permit, the Permittee may store and treat in tanks only the hazardous wastes specified in the Waste Analysis Plan, Attachment II.B (see Module II), of this Permit.

IV.A.2 The Permittee shall store or treat in tanks only waste generated at the RFAAP by either the Permittee or the RFAAP tenant organizations. This waste shall be within the limitations described in Attachment II.B. The Permittee shall not store or treat any waste generated outside of the facility.

IV.A.3 The Permittee may store and/or treat hazardous waste only in tanks T-1A and T-1B located in the Grinder Building, Building 442.

IV.Aa PERMITTED WASTES – EWI-CWP

IV.Aa.1 Subject to the terms of this Permit, the Permittee may store and treat in tanks only the hazardous wastes specified in the Waste Analysis Plan, Attachment II.Ba (see Module II), of this Permit.

IV.Aa.2 The Permittee shall store or treat in tanks only waste generated at the RFAAP by either the Permittee or the RFAAP tenant organizations. This waste shall be within the limitations described in Attachment II.Ba. The Permittee shall not store or treat any waste generated outside of the facility.

IV.Aa.3 The Permittee may store and/or treat hazardous waste in the following tanks:

- Grinder Feed Tanks (613-T-30103 and 613-T-30131)
- Kiln Feed Storage Tanks 1, 2, and 3 (slurry tanks) (613-T-30079, 613-T-30164, 613-T-30197)
- Makeup Water Tank (613-T-30015)
- Decant Tank (613-T-30028)

IV.Aa.4 When managed within the EWI-CWP complex, tenant wastes will be treated in the same manner as wastes generated by the operating contractor. All tenant wastes will be treated within 90 days from the point of generation by the RFAAP tenant organization or will be transferred to an appropriately permitted storage unit, such as the kiln feed storage tanks.

IV.B. TANK MANAGEMENT PRACTICES – EWI

IV.B.1 Design and Construction of Tanks

The Permittee shall construct, modify, and maintain all permitted hazardous waste storage and treatment tanks in accordance with the plans and specifications in Attachment IV.A. In order to ensure sufficient structural strength, the Permittee shall maintain a minimum shell thickness of 0.25 inches for all permitted tanks at all times.

IV.B.2 Protection From Overfilling

The Permittee shall prevent overfilling of tanks by the use of automatic high level alarms as specified in Attachment IV.B.

IV.B.3 The integrity of tank and process area containment systems shall be maintained. Cracks, gaps, loss of integrity, deterioration, corrosion, or erosion of pads, berms, curbs, sumps, construction joints, and coatings of the tank system area shall be repaired in accordance with the protocols and frequencies delineated in Attachments II.C (see Module II) and IV.A.

IV.Ba TANK MANAGEMENT PRACTICES – EWI-CWP

IV.Ba.1 Design and Construction of Tanks

The Permittee shall construct, modify, and maintain all permitted hazardous waste storage and treatment tanks in accordance with the plans and specifications in Attachment IV.Aa. In order to ensure sufficient structural strength, the Permittee shall maintain a minimum shell thickness of 0.25 inches for all permitted tanks at all times.

IV.Ba.2 Protection From Overfilling

The Permittee shall prevent overfilling of tanks by the use of automatic high level alarms as specified in Attachment IV.Ba.

IV.Ba.3 The integrity of tank and process area containment systems shall be maintained. Cracks, gaps, loss of integrity, deterioration, corrosion, or erosion of pads, berms, curbs, sumps, construction joints, and coatings of the tank system area shall be repaired in accordance with the protocols and frequencies delineated in Attachments II.Ca (see Module II) and IV.Aa.

IV.C. SPECIAL REQUIREMENTS FOR REACTIVE WASTE

IV.C.1 The Permittee shall not place reactive waste in a tank unless the procedures described in Attachment IV.C are followed. The Permittee shall document compliance with this Permit condition as required by 40 CFR § 264.17(c) and shall place this documentation in the operating record pursuant to Permit Condition II.I.2. (see Module II).

IV.Ca SPECIAL REQUIREMENTS FOR REACTIVE WASTE – EWI-CWP

IV.Ca.1 The Permittee shall not place reactive waste in a tank unless the procedures described in Attachment IV.Ca are followed. The Permittee shall document compliance with this Permit condition as required by 40 CFR § 264.17(c) and shall place this documentation in the operating record pursuant to Permit Condition II.I.2. (see Module II).

MODLUE IV– LIST OF ATTACHMENTS

The following Attachments are incorporated, in their entirety, by reference into this Permit. These incorporated attachments are enforceable conditions of this Permit. Some of the documents contain excerpts from the Permittee' Hazardous Waste Permit Application. The Department has, as deemed necessary, modified specific language excerpted from the permit application. Additional modifications are prescribed in the Permit Conditions (Modules I through V), and thereby supersede the language of the attachments. Facility operations shall be in accordance with the contents of the Attachments and this Permit.

Attachment IV.A – Plans and Specifications for Tanks

Attachment IV.Aa – Plans and Specifications for Tanks for the EWI-CWP Complex

Attachment IV.B – Storage and Treatment Tank Operation

Attachment IV.Ba – Storage and Treatment Tank Operation for the EWI-CWP Complex

Attachment IV.C – Procedures for Handling Reactive Wastes in Tanks

Attachment IV.Ca – Procedures for Handling Reactive Wastes in Tanks for the EWI-CWP Complex

Attachment IV.A – Plans and Specifications for Tanks

IV.A.1 General

Two (2) hazardous waste tanks located in Building 442 are used for the storage and treatment of an aqueous waste slurry, which is piped from the tanks to the incinerators for destruction via incineration. The slurry is a mixture of waste energetic material and water. The general arrangement drawings for the Grinder Building and the grinder and slurry tanks, Figures IV.A-1 and IV.A-2, provide top and side views of the process train. The process train includes a container load trolley, a wet grinder, a metal and over-size dump, the two slurry tanks, a make-up water tank, two slurry pumps, and wastewater pumps.

The Grinder Building process flow diagram, Figure IV.A-3, describes the instrumentation that monitors and controls the equipment depicted above. The ground propellant flows directly from the wet grinder into either of the two tanks. Based on operational requirements, the control room operator will determine which tank will receive the ground propellant. Figure IV.A-4 is a pictorial drawing that shows the routing of the slurry mixture.

The two storage and treatment tanks are identical open-topped tanks. The tanks are situated one foot apart. When the first tank is full, the excess water is decanted to the second tank to achieve the appropriate slurry density. There is an interior closed loop piping system within the confines of the Grinder Building that recirculates the slurry and maintains the suspension. The piping system from the slurry tanks to the incinerator is bled off of this internal recirculating loop. Process operations are accomplished through a remote external control building (Building 447) with both air-operated and manually operated valves.

IV.A.2 Description of Tanks

The tanks are dish-bottom tanks with internal baffles and agitating units to maintain a homogeneous slurry mixture. Total and operational capacities of the tanks, as well as tank dimensions and support structures, are as follows:

Capacity:

Total	1,900 gallons (ea. tank)
Operational	1,520 gallons (ea. tank)

Dimensions:

Outer Diameter	6 ft, 6 in.
Height	8 ft, 4 in.
Thickness	0.25 in.

Support:

Steel Angle Legs 4" x 4" x ⅜"
Concrete Footings 12" x 12" x 7"

IV.A.3 Tank Corrosion and Erosion Protection

The tanks are constructed from Type 304 Stainless steel, which is compatible with the process materials (propellant slurry) and is resistant to internal corrosion. Both tanks are located inside a building, thus external corrosion from the elements is also insignificant.

IV.A.4 Secondary Containment System

The existing slurry tanks have secondary containment that meets the requirements of 9 VAC 20-60-264 and 40 CFR 264.193 by reference. Any spills or leaks from the two slurry tanks would be pumped to the catch tank, or in the event of a pump or power failure would be contained in the slurry pit of the basement. The 5,000 gallon catch tank provides adequate capacity of the containment of the maximum volume of spilled slurry, 3,800 gallons. The basement of the Grinder Building is also capable of providing adequate containment capacity as demonstrated below:

Dimensions of basement:

16-ft x 26.75-ft x 17.88-ft x 7.48 gal/ft^2 = **57,242 gallons**

Tanks in Grinder Building:

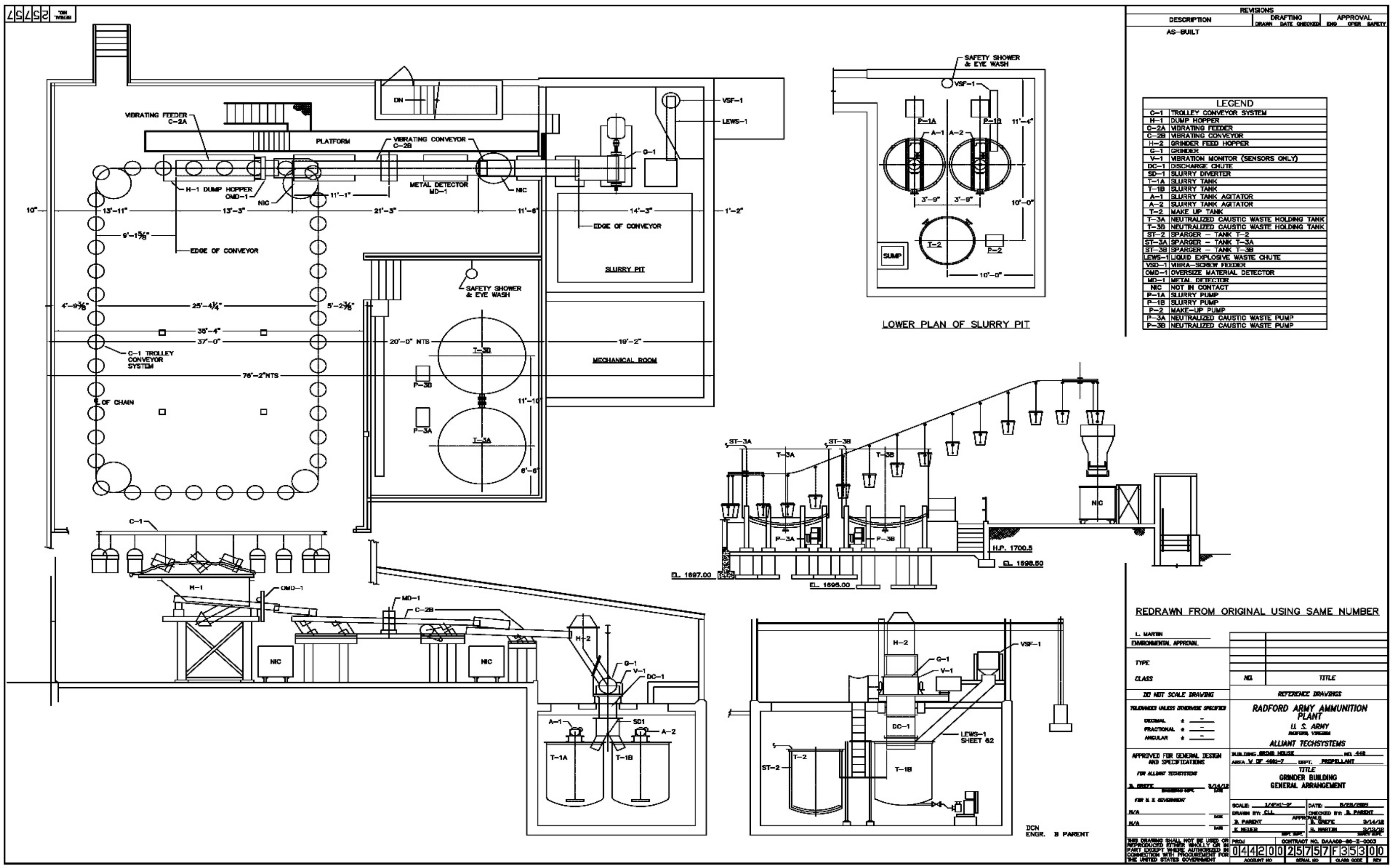
2 slurry tanks (1,900 gallons each)
2 neutralization caustic waste holding tanks (5,000 gallons each)
1 makeup water tank (1,500 gallons)
(2 x 1,900 gal) + (2 x 5,000 gal) + 1,500 gal = **15,300 gallons**

Containment Available:

57,242 gal – 15,300 gal = 41,942 gallons

The Grinder Building basement is constructed of concrete. The secondary containment structure for the tanks in the Grinder Building does not have a coating; however, the concrete is compatible with the waste and is of sufficient strength and thickness to prevent failure owing to pressure gradients. In addition, the Grinder Building floor is free from cracks and gaps. The floor is designed to drain and remove liquids resulting from leaks and spills. Any spilled or leaked waste will be removed from the secondary containment system within 24 hours. The tanks are inspected daily to ensure their integrity. The method of leak detection is to inspect the secondary containment once every 24 hours.

Figure IV.A-1 – Grinder Building General Arrangement (DWG No. 25757)



Attachment III.1.A, Figure III.1.A.1

Figure IV.A-2 – Grinder and Slurry Tank Arrangement (DWG No. 25764)

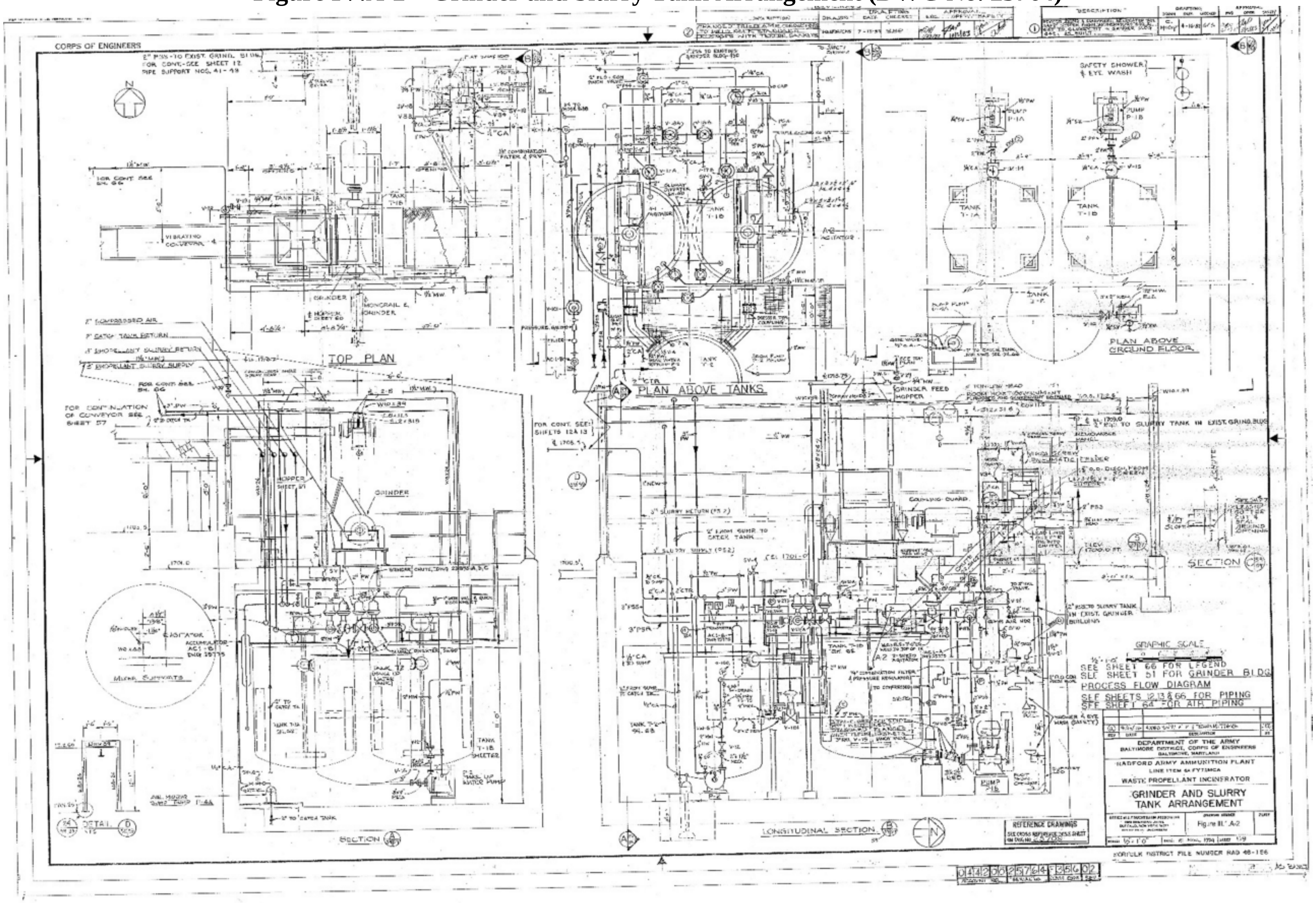


Figure IV.A-3 – Grinder Building Process Flow Diagram (DWG No. 25756)

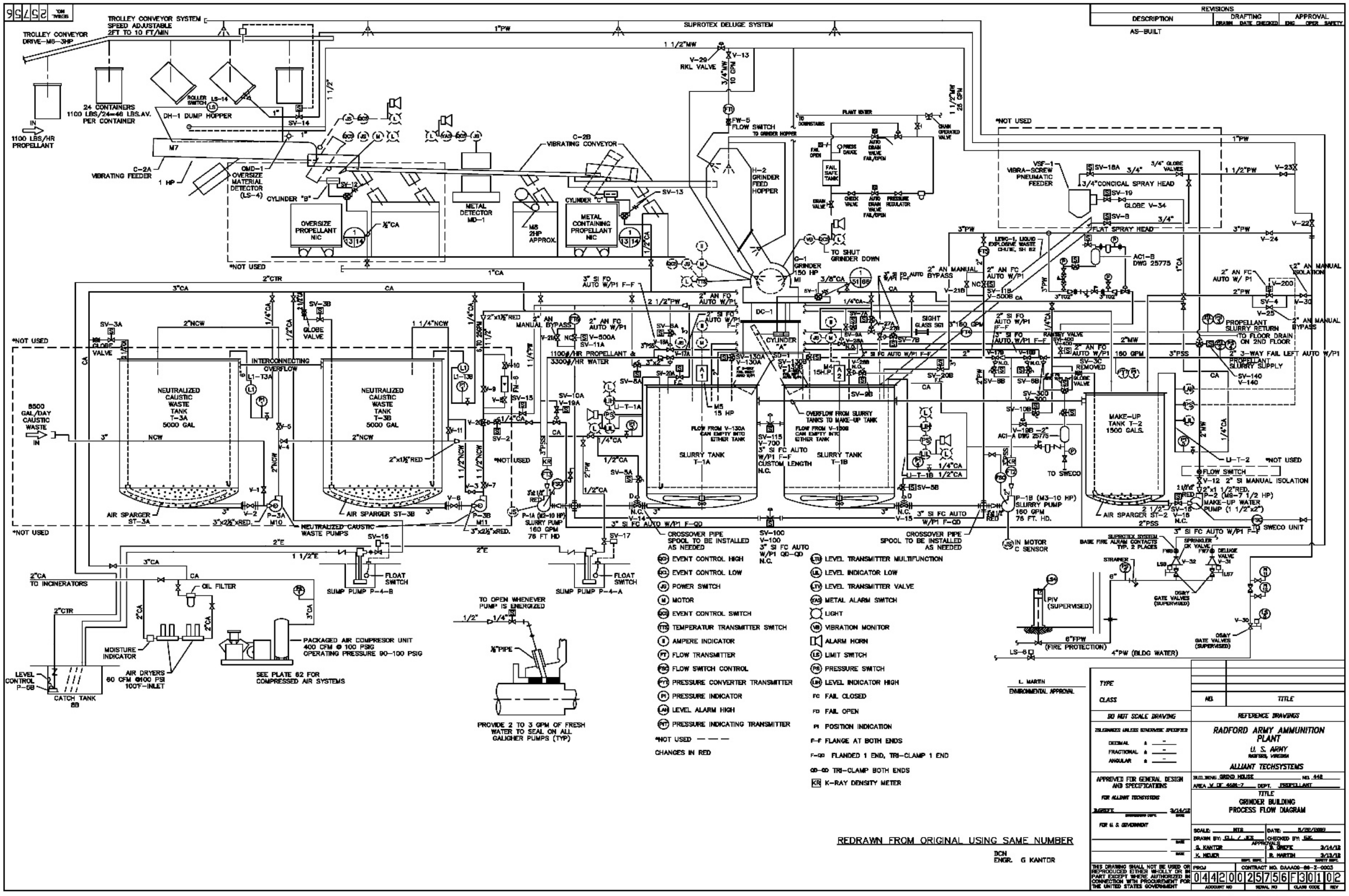
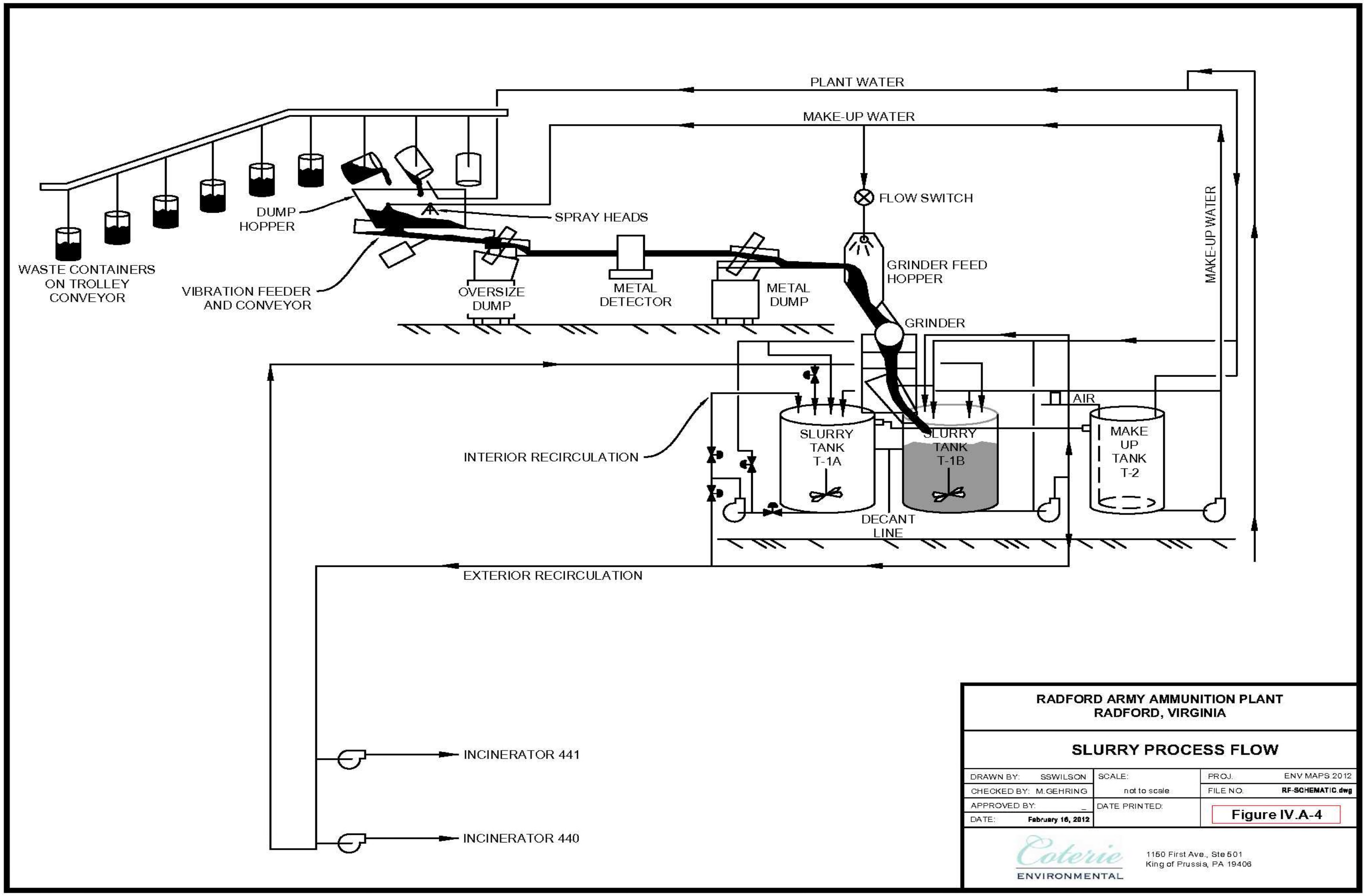


Figure IV.A-4 – Slurry Process Flow



Attachment IV.Aa - Plans and Specifications for Tanks for the EWI-CWP Complex

IV.Aa.1. General

The Grinder Building (Building 613) houses the equipment necessary to prepare the hazardous energetic wastes for treatment in the rotary kiln incinerators. This process includes the following operations:

- An unloading and inspection station, where wastes are passed through a metal detector, visually inspected, and loaded onto a bucket conveyor for each grind

- A grinding operation, which consists of the two Grinder Feed Tanks, a Makeup Water Tank, a Decant Tank, a shredder-style grinder, and a rotary cutter. This operation mixes the energetic waste with sufficient quantities of water and safely reduces the waste in size such that it can be worked into a "slurry" for feeding to the incinerators.

- A waste storage and circulation system, which consists of the three Kiln Feed Storage Tanks and a slurry circulation loop. This operation collects the outflow from the grinder operation, stores the waste, and provides the feed for the rotary kiln incinerators.

- A firewater collection system that is designed to collect and store any firewater that results from activation of the deluge-style fire suppression system in the building. (Note these tanks are for storage of firewater released during an event and are not used for hazardous waste storage).

A general process flow diagram for the building's operations is provided in Figure IV.Aa-1. The plans and specifications for the seven (7) permitted hazardous waste treatment and storage tanks are described herein. General arrangement drawings for the Grinder Building processes are provided in Figures IV.Aa-2 through IV.Aa-4. A detailed description of each stage of the operation is provided in Attachment IV.Ba.

IV.Aa.2. Grinding Operations

The grinding operation housed within the Grinder Building is intended to serve two purposes: reduce the size of the energetic waste to a uniform size for burning and provide the necessary water mixtures to ensure safe grinding and burning of the materials. In this process, four different hazardous waste tanks are utilized:

- Makeup Water Tank 613-T-30015

- Decant Tank 613-T-30028

- Grinder Feed Tanks 613-T-30103 and 613-T-30131

IV.Aa.3. Waste Storage Operations

Once the grinding operation is complete, the waste slurry is stored in one of three hazardous waste storage tanks prior to being fed to the incinerators. These three tanks are commonly called the slurry tanks. On the included drawings, these tanks are delineated as follows:

- Kiln Feed Storage Tank 1 (613-T-30079)
- Kiln Feed Storage Tank 2 (613-T-30164)
- Kiln Feed Storage Tank 3 (613-T-30197)

IV.Aa.4. Description of Tanks

Table IV.Aa-1 provides a description of each of the hazardous waste treatment and storage tanks included within the Grinder Building. The table specifies the capacity and dimension of each tank, as well as the purpose of the tank. Detailed design drawings for the tanks are provided in Figures IV.Aa-5 through IV.Aa-8. Note that the drawings provided are engineering drawings and not final drawings of fabricated tanks. The design standards for the tanks are specified on the drawings and in this Permit. Final, as-built drawings will be provided in place of the design drawings after construction is completed.

IV.Aa.5. Tank Corrosion and Erosion Protection

All of the hazardous waste treatment and storage tanks included in the Grinder Building operations are constructed from Type 304 Stainless steel, which is compatible with the process materials (propellant slurry) and is resistant to internal corrosion. Further details on the corrosion and erosion protection afforded by the tank design is provided in Appendix IV.Aa-1 in the required Tank Assessment for new tanks.

IV.Aa.6. Secondary Containment System

The hazardous waste treatment and storage tanks located within the Grinder Building have secondary containment that meets the requirements of 9 VAC 20-60-264 and 40 CFR §264.193. Any spills or leaks from these tanks would be collected in the Grinder Building sump or trench drain, or within the Grinder Building itself, which is sloped towards the trench drain and sump and designed to provide additional containment capacity. In accordance with the applicable requirements, the secondary containment system is:

- Designed to prevent any migration of wastes or accumulated liquid out of the Grinder Building to the surrounding soil, ground water, or surface water;
- Lined with an epoxy material that is compatible with the wastes contained within the tanks;
- Provided with a leak detection system that is capable of immediately detecting any releases of liquid into it and notifying the operator of the release; and
- Provided with a system of removing the liquids resulting from any spills to an appropriately permitted storage tank.

The containment system is designed to contain 100 percent of the largest hazardous waste tank within the Grinder Building, as demonstrated below and in the calculations provided in Appendix IV.Aa-2. The building is also equipped with a permanent roof and elevated above grade such that any run-on or infiltration of precipitation into the containment system is prevented.

Largest Hazardous Waste Tank: 13,100 gallons (Decant Tank)

Containment Capacity of Grinder Building Sump: 1,077 gallons

Containment Capacity of Grinder Building Trench Drains: 2,382 gallons

Containment Capacity of Grinder Building Floor: 60,060 gallons

Total Containment Capacity: 63,519 gallons

In addition to the tanks, the secondary containment system within the Grinder Building also provides secondary containment for all equipment ancillary to the tank operation, including all pipes, pumps, etc. Once the piping leaves the Grinder Building, it is located above a containment spillway that drains to the Grinder Building. This spillway is curbed and roofed to help prevent run-on and infiltration of precipitation into the containment structure.

Figure IV.Aa-1 –Grinder Building General Process Flow

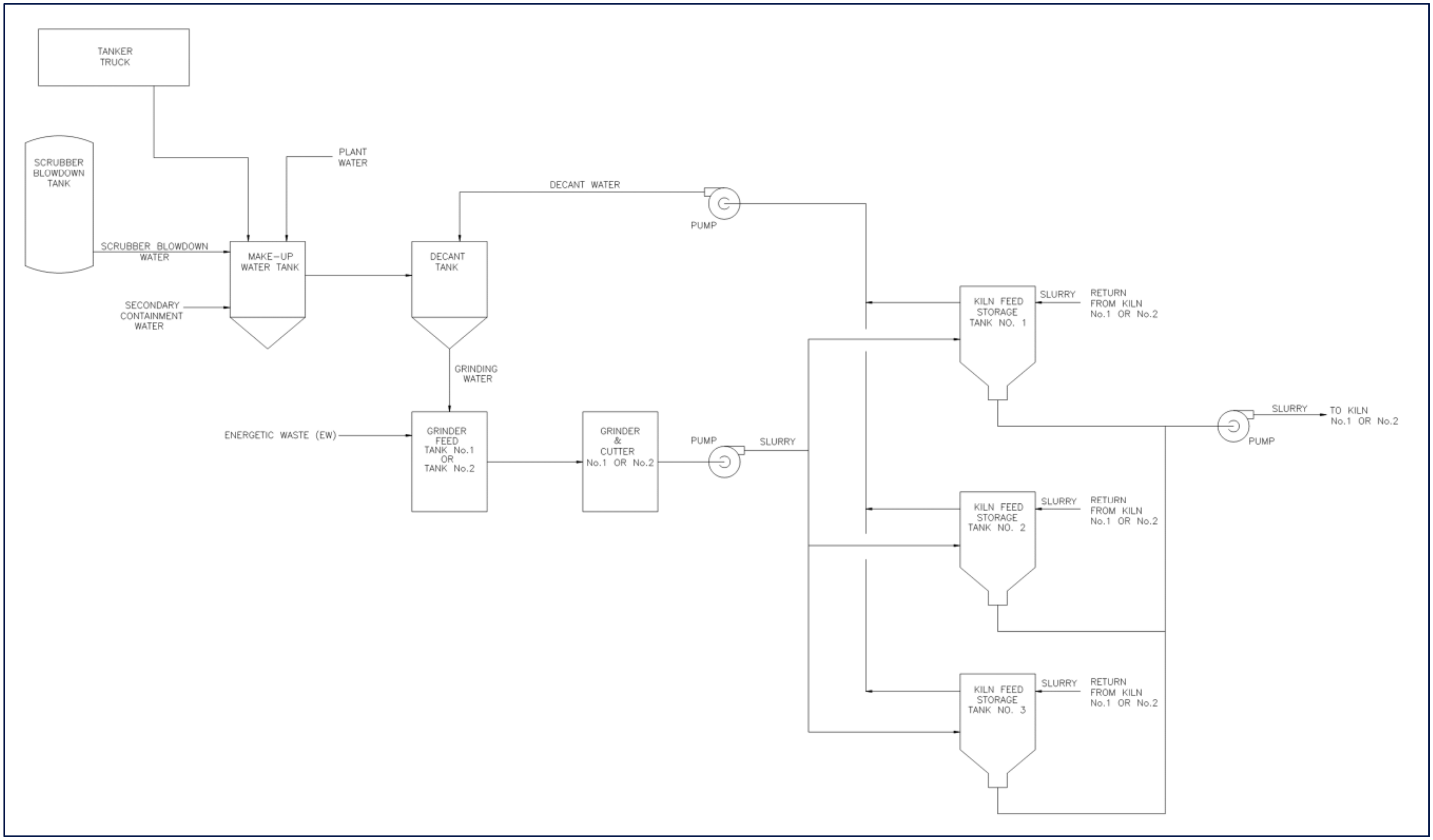


Figure IV.Aa-2 –Grinder Building General Arrangement Drawing, Plan View (061300-69149-F367)

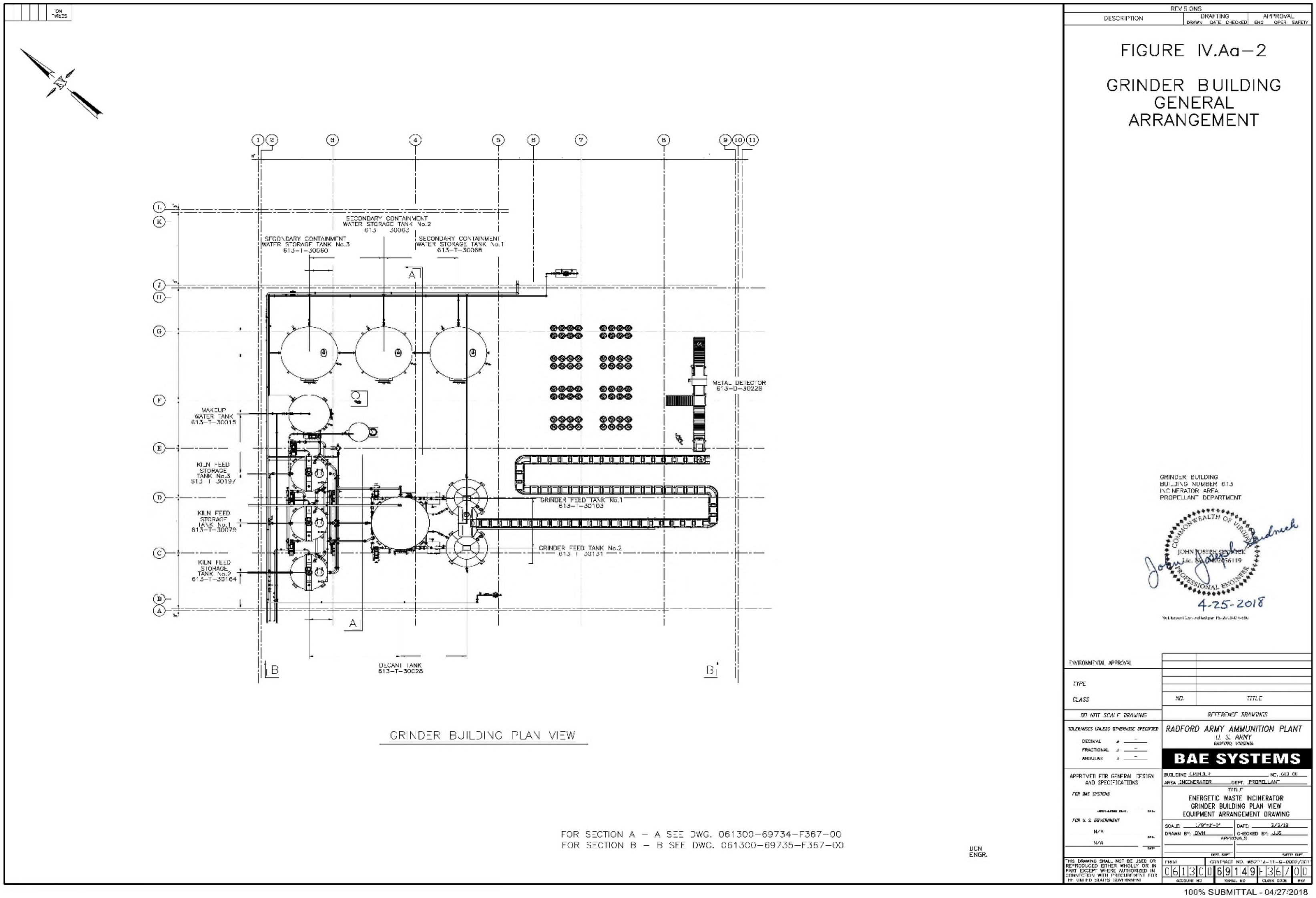


Figure IV.Aa-3 –Grinder Building General Arrangement Drawing, Elevation A-A (061300-69734-F367-00)

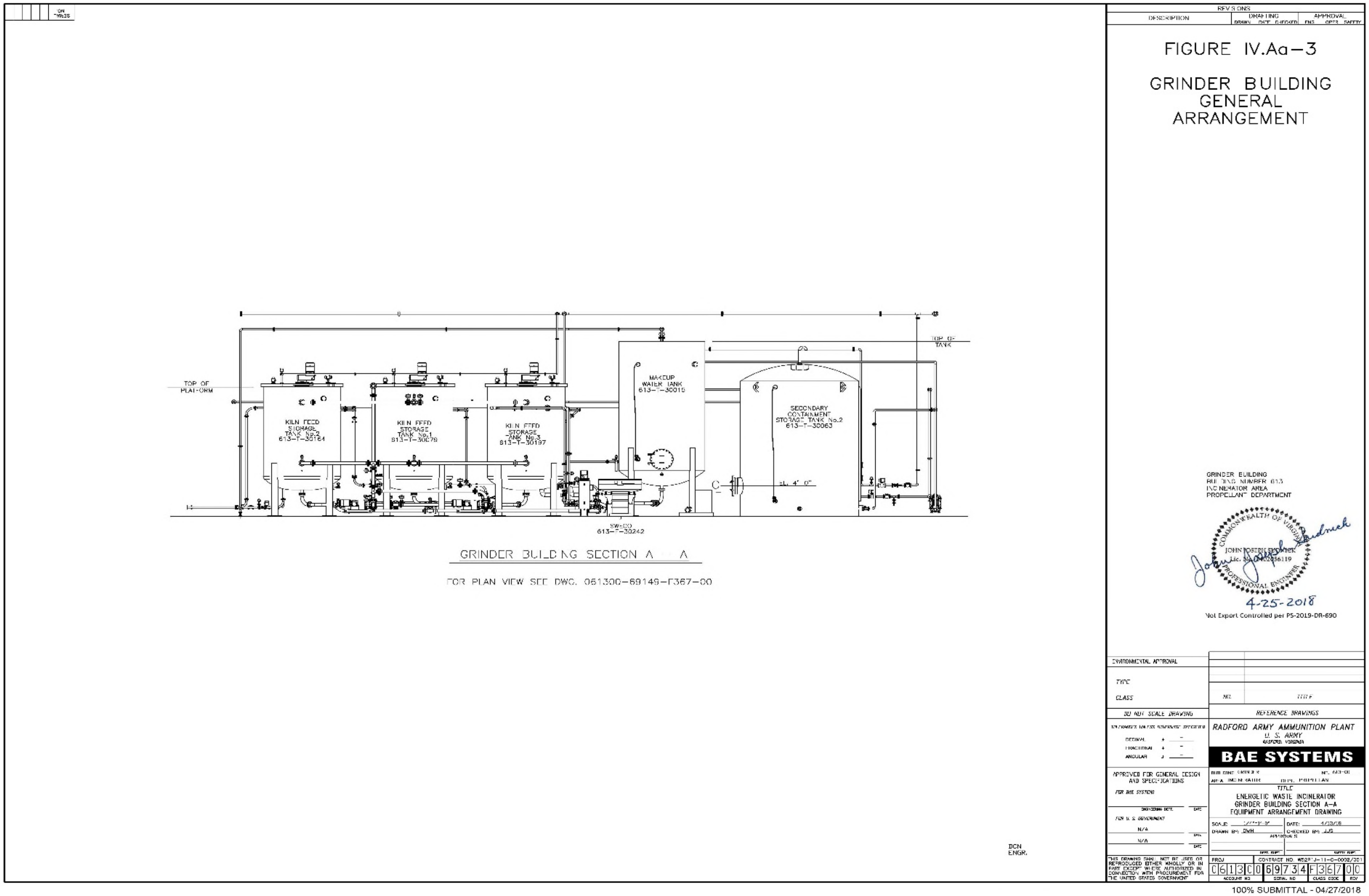


Figure IV.Aa-4 – Grinder Building General Arrangement, Elevation B-B (061300-69735-F367-00)

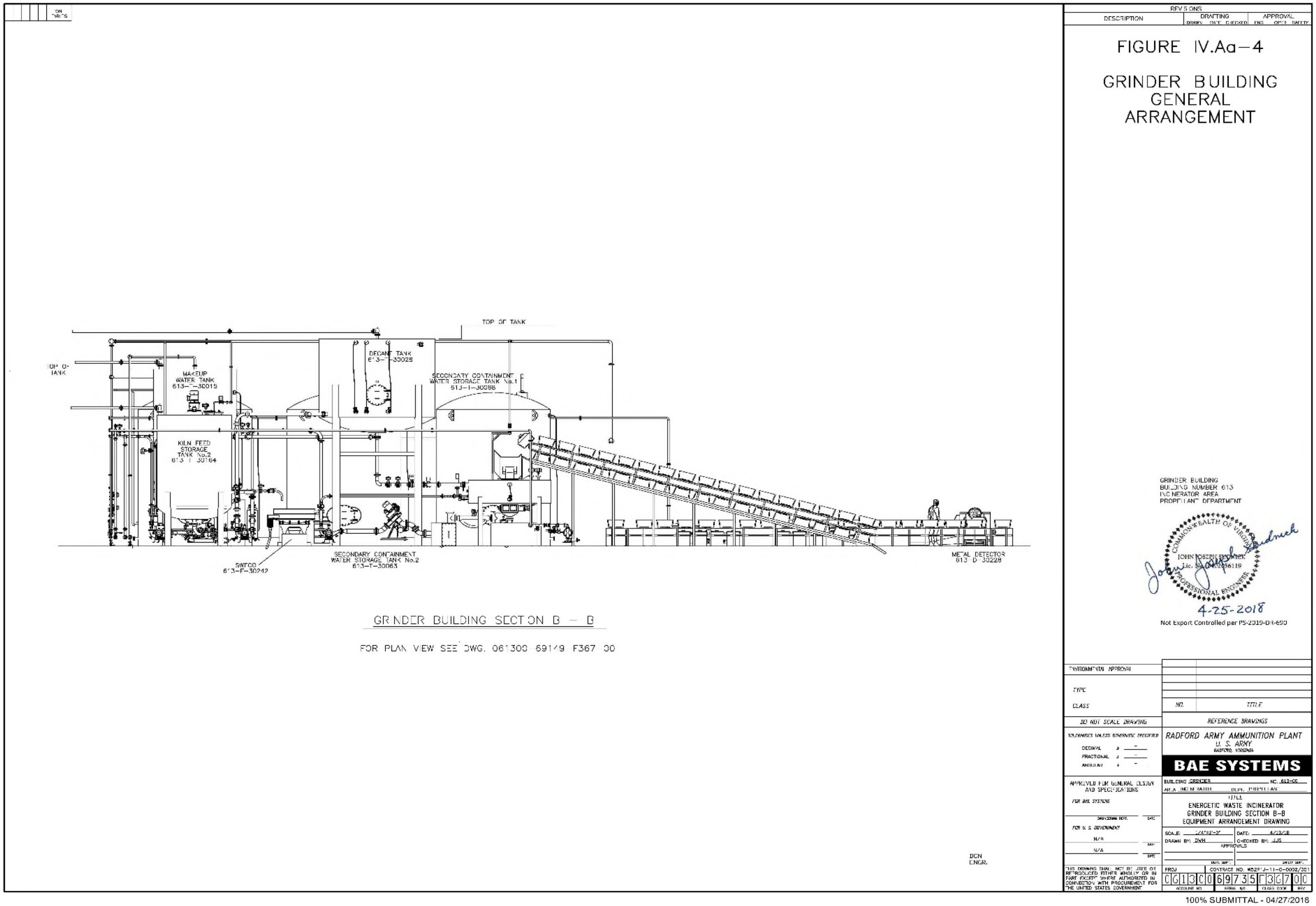


Figure IV.Aa-5 – Makeup Water Tank Engineering Drawing (DWG No. 061300-69122-T160-00)

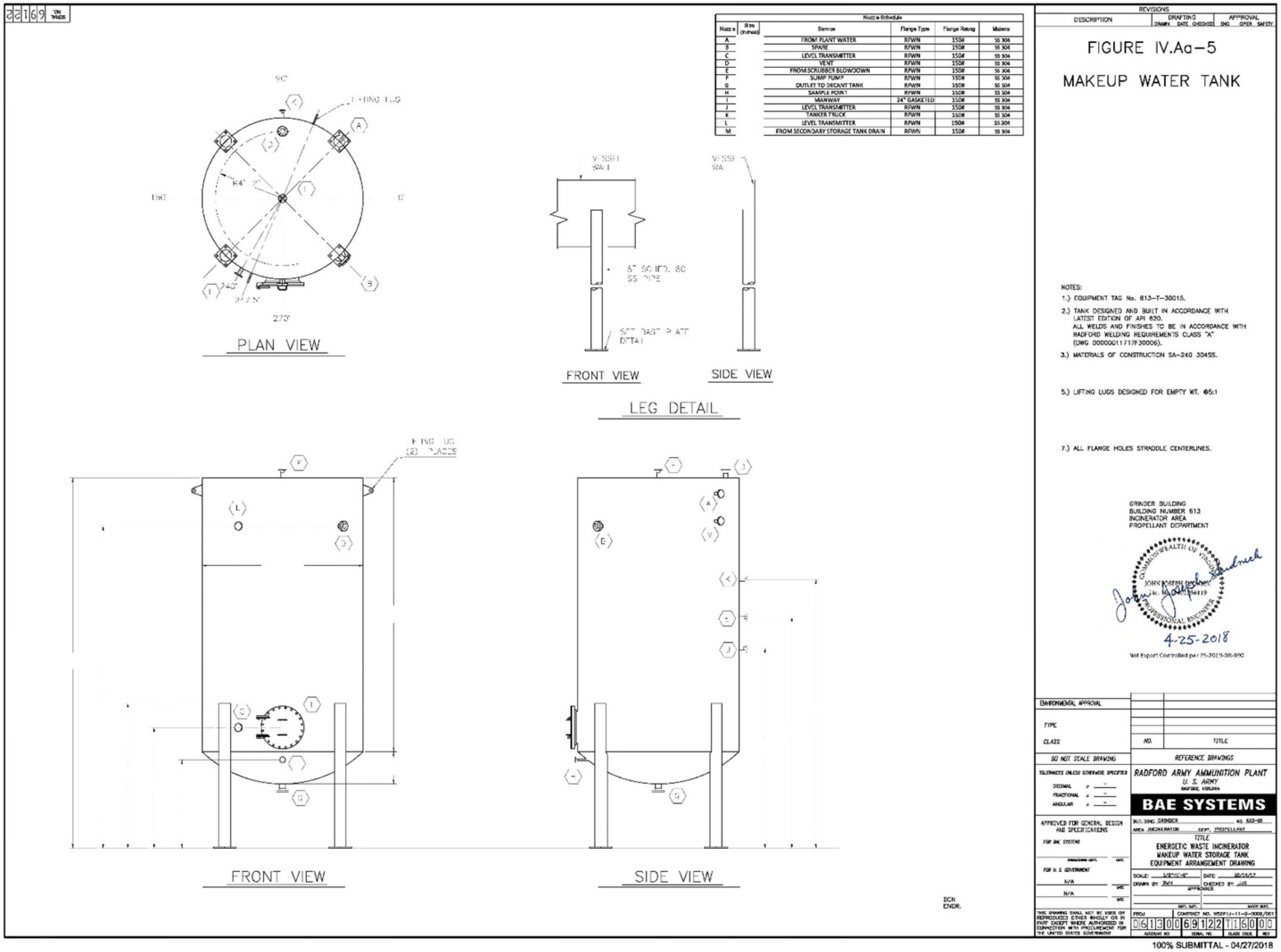
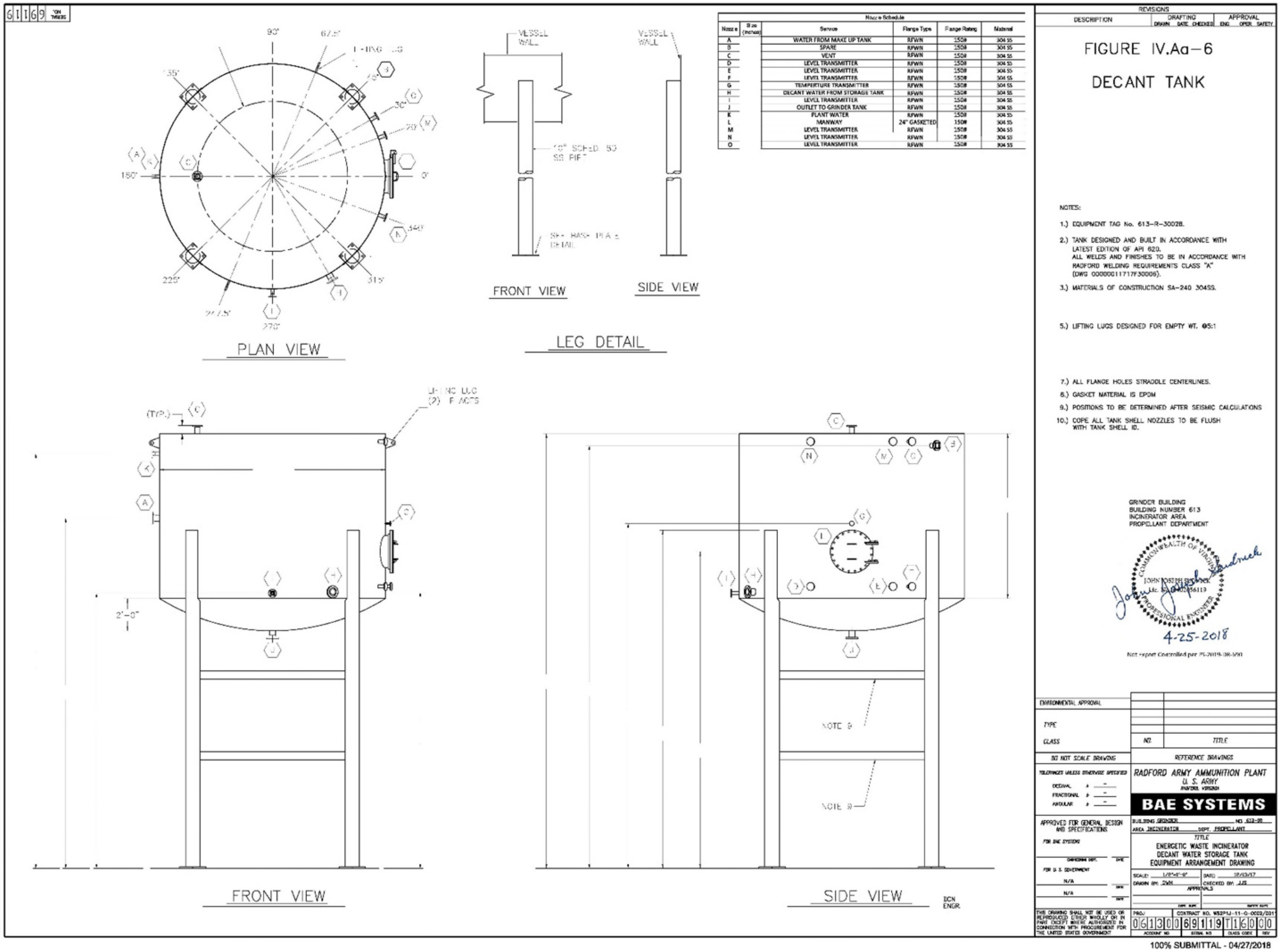


Figure IV.Aa-6 – Decant Tank Engineering Drawing (DWG No. 061300-69119-T160-00)



Nozzle Schedule

Nozzle	Size (inches)	Service	Flange Type	Flange Rating	Material
A		WATER FROM MAKE UP TANK	RFWN	150#	304 SS
B		SPARE	RFWN	150#	304 SS
C		VENT	RFWN	150#	304 SS
D		LEVEL TRANSMITTER	RFWN	150#	304 SS
E		LEVEL TRANSMITTER	RFWN	150#	304 SS
F		LEVEL TRANSMITTER	RFWN	150#	304 SS
G		TEMPERTURE TRANSMITTER	RFWN	150#	304 SS
H		DECANT WATER FROM STORAGE TANK	RFWN	150#	304 SS
I		LEVEL TRANSMITTER	RFWN	150#	304 SS
J		OUTLET TO GRINDER TANK	RFWN	150#	304 SS
K		PLANT WATER	RFWN	150#	304 SS
L		MANWAY	24" GASKETED	150#	304 SS
M		LEVEL TRANSMITTER	RFWN	150#	304 SS
N		LEVEL TRANSMITTER	RFWN	150#	304 SS
O		LEVEL TRANSMITTER	RFWN	150#	304 SS

Figure IV.Aa-7 – Grinder Feed Tank Engineering Drawing (DWG No. 061300-69126-T160-00)

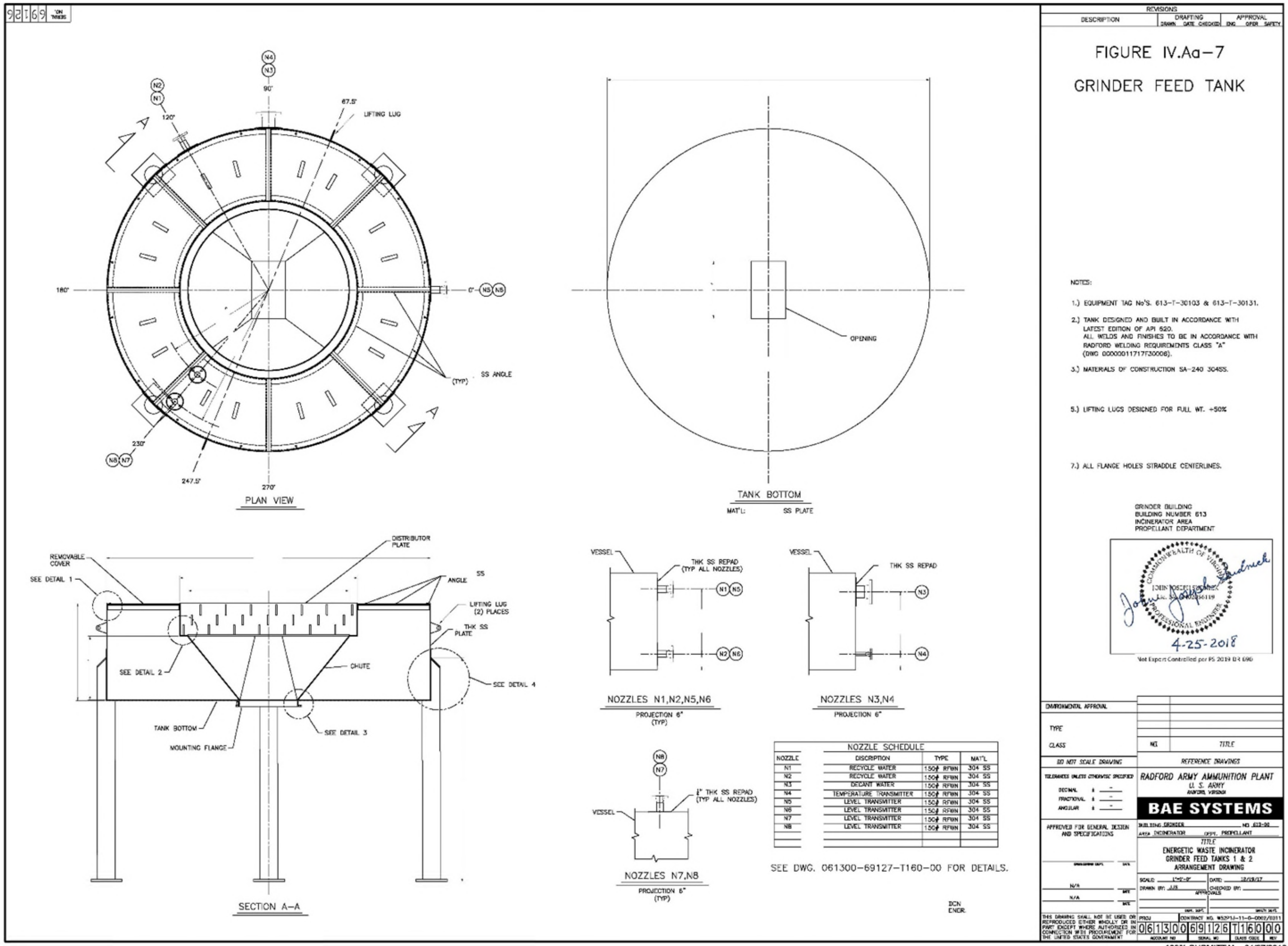


Figure IV.Aa-8 – Kiln Feed Storage Tank Engineering Drawing (DWG No. 061300-69121-T160-00)

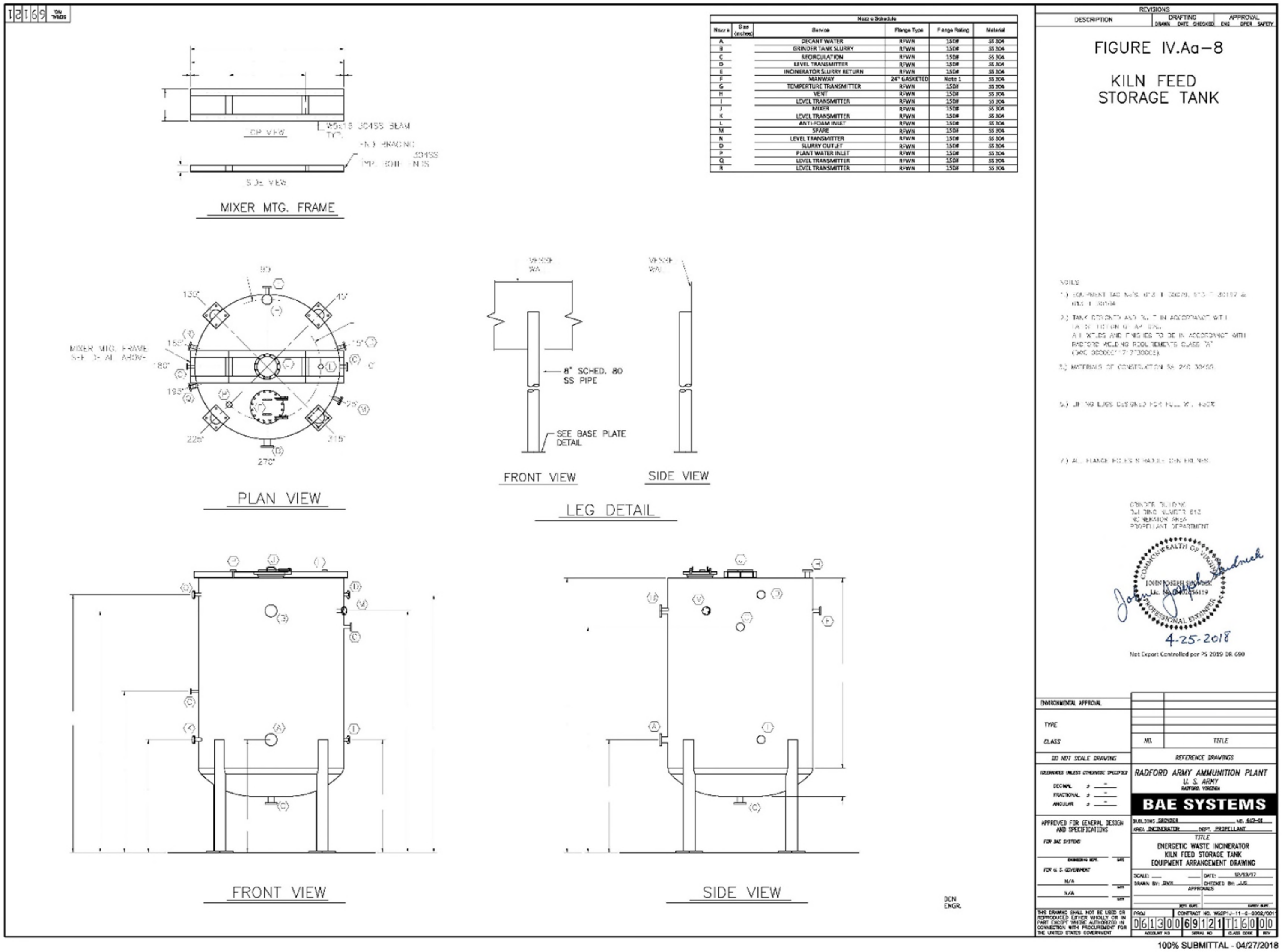


Table IV.A-1 - Hazardous Waste Treatment and Storage Tank Design Details

<table>
<tr><th rowspan="2">Tank</th><th rowspan="2">ID No.</th><th rowspan="2">Capacity</th><th colspan="4">Dimensions</th><th rowspan="2">Construction</th><th rowspan="2">Purpose</th></tr>
<tr><th>Straight Side Height</th><th>Diameter</th><th>Bottom Height/Type</th><th>Height above grade 1</th></tr>
<tr><td>Makeup water tank</td><td>613-T-30015</td><td>10,450 gal.</td><td>17’</td><td>10’</td><td>2’ dished</td><td>4’</td><td>Fixed, flat roof, SA-240 304 SS conforming to API 620</td><td>Store liquid hazardous and non-hazardous waste and contaminated process water for use in grinder operation</td></tr>
<tr><td>Decant tank</td><td>613-T-30028</td><td>13,100 gal.</td><td>10’-3”</td><td>14’</td><td>2’ dished</td><td>15’</td><td>Fixed, flat roof, SA-240 304 SS conforming to API 620</td><td>Supply either process water or makeup water to the grinder operation</td></tr>
<tr><td>Grinder Tank#1</td><td>613-T-30103</td><td>1,762 gal.</td><td rowspan="2">3’</td><td rowspan="2">10’</td><td rowspan="2">Flat</td><td rowspan="2">5’-7”</td><td rowspan="2">Open top, SA-240 304 SS conforming to API 620</td><td rowspan="2">Hold water and receive waste for processing through the grinder operation</td></tr>
<tr><td>Grinder Tank#2</td><td>613-T-30131</td><td>1,762 gal.</td></tr>
<tr><td>Kiln Feed Storage Tank#1</td><td>613-T-30079</td><td>6,000 gal.</td><td rowspan="2">11’-9.5”</td><td rowspan="2">9’</td><td rowspan="2">1’-9.25” dished</td><td rowspan="2">3’-5.75”</td><td rowspan="2">Fixed flat roof, SA-240 304 SS conforming to API 620</td><td rowspan="2">Store slurried hazardous energetic waste prior to thermal treatment</td></tr>
<tr><td>Kiln Feed Storage Tank#2</td><td>613-T-30164</td><td>6,000 gal.</td></tr>
</table>

Tank	ID No.	Capacity	Dimensions				Construction	Purpose
			Straight Side Height	Diameter	Bottom Height/Type	Height above grade 1		
Kiln Feed Storage Tank#3	613-T-30197	6,000 gal.						
Secondary Containment Water Storage Tank#1 [2]	613-T-30068	20,000 gal.	17'-9.5"	13'-9"	Flat	At grade	Fixed, dished roof, HDPE conforming to ASTM 01998-15	Store water from sprinkler trips (not hazardous waste tanks)
Secondary Containment Water Storage Tank#2 [2]	613-T-30063	20,000 gal.						
Secondary Containment Water Storage Tank#3 [2]	613-T-30060	20,000 gal.						

1. As measured from the floor of the Grinder Building to the bottom of the tank.
2. These tanks are not hazardous waste treatment or storage tanks but are identified here for understanding of the included building drawings and piping and instrumentation diagrams (P&IDs) . Despite the name assigned them on the included drawings, these tanks are not used for storage of waste materials collected in the secondary containment system. These tanks are only used in the event of a sprinkler trip in the Grinder Building. If this were to occur, the water collected in the containment sumps and the floor of the Grinder Building would be directed to these tanks. As the secondary containment sumps are inspected daily and equipment with level alarms to indicate the presence of material in them, it is not expected that any hazardous waste would be in the sumps at the time of the sprinkler release.

Appendix IV.Aa-1 - Hazardous Waste Tanks Engineering Assessment

Project Integration, Inc.

April 22, 2018

Mary McCoy
Environmental Manager
BAE Systems, Inc.
Radford Army Ammunition Plant
4050 Peppers Ferry Rd
P.O. Box 1
Radford, VA 24141

Subject: Engineering Assessment Hazardous Waste Tanks

Dear Ms. McCoy :

The Radford Army Ammunition Plant (RFAAP) in Radford, Virginia is currently in the design phase of a new hazardous waste incineration system that will be subject to the Hazardous Waste Combustor (HWC) Maximum Achievable Control Technology (MACT) standard and the Resource Conservation and Recovery Act (RCRA) regulations for facilities generating and disposing of hazardous waste.

A preliminary engineering assessment was made on the hazardous waste tanks for the facility. This analysis was done in accordance with Title 40 CFR Section 265.19(a).

The tanks that were assessed are listed below.

Kiln Feed Storage Tanks

Quantity 3

Volume .... 6,000 gallons

Operating Pressure .... Atmospheric

Design Pressure .... -1.0 psig to 10.0 psig

Orientation .... Vertical on legs

Material of Construction .... 304 SS

Waste Specific Gravity .... 1 to 1.2

Design Code .... API 620 Latest Edition

Mary McCoy
BAE Systems
April 22, 2018

Grinder Feed Tank

Quantity 2

Volume .... 1,762 gallons

Operating Pressure .... Atmospheric

Design Pressure .... Open top designed for full liquid

Orientation .... Vertical on legs

Material of Construction .... 304 SS

Waste Specific Gravity .... 1 to 1.1

Design Code .... API 620 Latest Edition

Make Up Water Tank

Quantity 1

Volume .... 10,450 gallons

Operating Pressure .... Atmospheric

Design Pressure .... -1.0 psig to 10.0 psig

Orientation .... Vertical on legs

Material of Construction .... 304 SS

Waste Specific Gravity .... 1 to 1.1

Design Code .... API 620 Latest Edition

Mary McCoy
BAE Systems
April 22, 2018

Decant Tank

Quantity 1

Volume .... 13,100 gallons

Operating Pressure .... Atmospheric

Design Pressure .... -1.0 psig to 10.0 psig

Orientation .... Vertical on legs

Material of Construction .... 304 SS

Waste Specific Gravity .... 1 to 1.1

Design Code .... API 620 Latest Edition

The tanks have been designed and specified to be fabricated, inspected, and tested per the following codes:

- API 620 Design and Construction of Large, Welded, Low-pressure Storage Tanks Twelfth Edition
- BAE/Radford Class A, B, C Welding Requirements
- Applicable parts of 40 CFR Part 264.1050, Subpart BB

The preliminary design was used to estimate the maximum weight of each tank. These weights were used to design foundations for the tanks. These foundations are designed and specified to comply with the following:

- IBC 2015 Edition
- UFC 3-301-01

The following documents are attached to this letter for reference:

1. Preliminary hand calculations to determine the thickness of the tank and heads for the specified design pressures.
2. Preliminary hand calculations (for sizing) for seismic loading on the tanks/supports.
3. Computer generated seismic calculations for a flat bottom tank.
4. Discussion and justification for material selection used in the fabrication of the tanks.

This assessment is provided and attested to providing the following conditions:

- The fabrication of the tanks shall be done by an appropriate code certified tank fabricator.
- The licensed/certified tank fabricator shall supply appropriate documentation to certify that:
  - The tanks were designed per the prescribed codes
  - The appropriate materials were used for the tank
  - The tanks were fabricated (with specified hold and inspection points) per the code
  - The tanks were tested in accordance with the code by an independent testing contractor.
- The quality of the design, fabrication, and testing shall be over seen by a code certified inspector and an agent assigned by the owner/manager of the facility.
- The foundations for the tanks shall be designed and sealed by a Virginia licensed structural engineer and installed by a certified concrete contractor with experience in similar applications.
- The quality of the foundation materials and installation shall be verified by a Virginia licensed inspector with oversight by a Virginia licensed professional structural engineer.

Provided that all of the stipulations outlined above are adhered to and verified I certify under penalty of law that this document and all attachments were prepared under my direction and supervision according to a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information is, to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment for knowing violations. I certify that my services have been retained by BAE Systems to analyze the preliminary tanks design data to ensure the tank system will not collapse, rupture, or fail provided it is fabricated according the codes specified.

Sincerely,

John J. Sudnick

Project Integration, Inc.

John J. Sudnick, PE (Virginia)
Director of Engineering
Virginia PE License No. 0402056119

Project Integration, Inc.
Virginia Secretary of State COA –F201422-5
Virginia Engineering Board COA – 0407006941

COMMONWEALTH OF VIRGINIA
JOHN JOSEPH SUDNICK
Lic. No. 0402056119
PROFESSIONAL ENGINEER

CUSTOMER: BAE / RADFORD	JOB NO. 150326C1
SUBJECT: KILN FEED/STORAGE TANKS 613-T- 30079, 30164, 30197	PAGE 1 OF 3
BY: JJS · DATE: 3-17-2018 · APPROVED BY:	DATE:

USE SLURRY STORAGE

DIAMETER - 9'-0" OD MATERIAL 304 SS
SS - 12'-0" 54-240
TOP HEAD - FLAT
BOTTOM HEAD - ASME F&D

DESIGN OPERATING PRESSURE -1 psig to 5 psig

DESIGN TEMPERATURE 50 °F - 150 °F

PRESSURE FROM HYDRAULIC LOADING 5.2 psi

DESIGN FOR 10 psi

CIRCUMFERENTIAL STRESS

$t = \frac{PR}{SE - 0.6P}$

P = 10 psig
E = JOINT EFFICIENCY = 0.70
R = 54 in

$t = \frac{10\ lb\ \ 54\ in\ \ in^2}{(0.70\ in^2\ \ 14{,}000\ lb - 0.6(10))}$

S = max allowable Stress = 14,000 psI

$t = \frac{540}{9{,}794} = 0.055$ USE 1/4"

LONGITUDINAL STRESS

$t = \frac{10(54)}{2(14{,}000)(0.7) + 0.4(10)} = \frac{540}{19604} = 0.0275"$

CUSTOMER: BAE / RADFORD	JOB NO. 150326C1
SUBJECT: KILN FEED / STORAGE TK	PAGE 2 OF 3
BY: JJS / DATE: 3-17-2018 / APPROVED BY:	DATE:

BOTTOM HEAD

ELLIPSODIAL HEAD

$$t = \frac{PD}{2SE - 0.2P} = \frac{10(54)}{2(14{,}000)(0.70) - 0.2(10)} = \frac{540}{19{,}598}$$

$t = 0.0276$ in USE 1/4"

FLAT HEAD (NO REINFORCEMENT)

$t = d\sqrt{CP/SE}$ $d = 108"$

$t = 108\sqrt{0.22(10)/14{,}000(0.7)}$

$t = 108(0.015)$

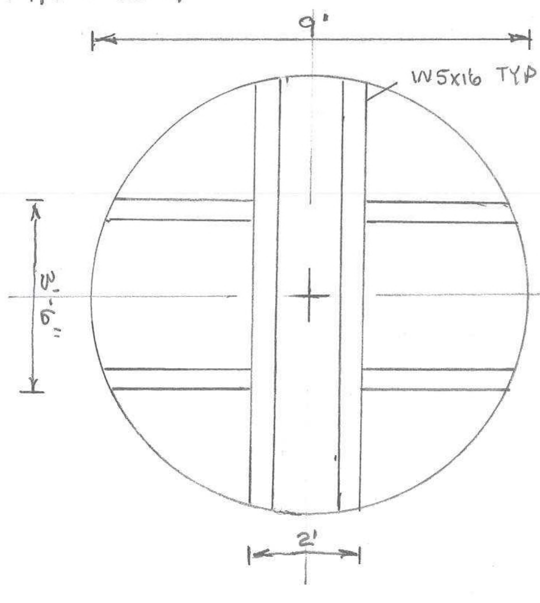
$= 1.62"$

WITH REINFORCEMENT

Equiv. $- d = 24"$

$t = 24(0.015) = 0.36$

USE 3/8"



CUSTOMER: BAE / RADFORD	JOB NO. 1503260I
SUBJECT: KILN FEED/STORAGE TK	PAGE 3 OF 3
BY: JJS · DATE: 3/17/2018 · APPROVED BY:	DATE:

TANK WEIGHT

SHELL - 3,461 lbs
TOP HEAD 975 lbs
BOTTOM HEAD 801 lbs
REINFORCEMENT 576 lbs
LIQUID 51,445 lbs

TOTAL WT - 57,258 lbs
SAFETY FACTOR 2 = 114,516

EACH LEG SUPPORT

$\frac{114,516}{4}$ = 28,630 lbs
USE 29,000
LEG HT = 5'-0"

ALLOWABLE LOAD

$F = n\pi^2 EI / L^2$

n = FACTOR - END CONDITIONS = 4 BOTH ENDS FIXED
E = MODULUS OF ELASTICITY psi
I = MOMENT OF INERTIA - in⁴
L = LENGTH OF COLUMN in

LEGS W8-67

F =
n = 4
E = 29 x 10⁶
L = 60
I = 88.6

$F = 4\pi^2 (29\times10^6)(88.6) / 60^2$

F = 28,176,624

CUSTOMER: BAE / RADFORD	JOB NO. 150326C1
SUBJECT: KILN FEED / STORAGE TANKS 613-T-30079, 30164, 30197 SEISMIC	PAGE 1 OF 1
BY: JJS · DATE: 3-17-2018 · APPROVED BY:	DATE:

SEISMIC ZONE - 1

$D = 9'\text{-}0''$ $\quad Z = 0.075 \quad w = 57,258\ \text{lbs}$

$H = 17'\text{-}0'' \quad X = 16.5\ \text{ft} \quad C_t = 0.035$

Fundamental VIBRATION

$$T = C_t \times H^{0.75} = 0.035 \times (17)^{0.75} = 0.2930$$

$I = 1 \quad S = 1 \quad R_w = 2.9$

$$C = \frac{1.25(1)}{(0.2930)^{0.67}} = 2.845 \qquad V = \frac{ZIC}{R_w} w = \frac{0.075(1)\,2.845}{2.9}(57,258)$$

$$V = 4,213$$

$$F_t = 0.07(T)(V) = 0.07(0.2930)(4213) = 86.4$$

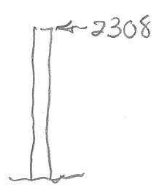
$$M_X = [\,86.4 \times 17 + (4213 - 86.4)(16.5 - 17/3)\,]$$

$$M_X = 1468.8 + (4126.6)(10.83)$$

$$= 46,160\ \text{ft-lb}$$

(4) LEGS $\quad M = 11,540\ \text{FT-lbs}$

$F = 2308\ \text{lbs}$



$$\text{DEFLECTION} = \frac{PL^3}{3EI} = \frac{2308\,(60)^2}{3(29\times10^6)(88.1)}$$

$$= 0.001$$

$$\text{STRES} = \frac{11,540\ 12\ (4)}{88.1} = 6,287\ \text{psi}$$

Project Integration, Inc. PO Box 170065, Spartanburg, SC 29301 • Phone: (864) 334-5085

CUSTOMER: BAE / RADFORD	JOB NO. 150326C1
SUBJECT: GRINDER FEED TANK 613-T-30103, 30131	PAGE 1 OF 2
BY: JJS · DATE: 3/17/2018 · APPROVED BY:	DATE:

USE – WET FEED OF GRINDER

DIAMETER – 10 ft
SS – 3 ft
TOP HEAD – NONE
BOTTOM HEAD – FLAT

MATERIAL 304 33
SA-240

DESIGN PRESSURE – 1.3 psi
DESIGN TEMPERATURE 50-100°F

CIRCUMFERENTIAL STRESS

$$t = \frac{PR}{SE - 0.6P}$$

$P = 1.3$
$R = 60"$
$E = 0.70$
$S = 14{,}000$

$$t = \frac{1.3(60)}{(14{,}000)(.7) - (0.6)(1.3)}$$

$t = 0.008"$ USE 1/4"

LONGITUDINAL STRESS

$t = 0.004$ USE 1/4"

TOP HEAD – NONE – OPEN TOP

BOTTOM HEAD – FLAT HEAD

Project Integration, Inc. PO Box 170065, Spartanburg, SC 29301 • Phone: (864) 334-5085

CUSTOMER: BAE/RADFORD	JOB NO. 150326C1
SUBJECT: GRINDER FEED TANK	PAGE 2 OF 2
BY: JJS · DATE: 3/17/2018 · APPROVED BY:	DATE:

P= 1.3 psi plus WEIGHT OF GRINDER 900 lbs.

AREA OF GRINDER 252 in²

900/252 = 3.57 psi

$t = d\sqrt{CP/SE}$

$= 120\sqrt{0.2(3.57)/14{,}000(.7)}$

$= 120(0.0085)$

$= 1''$

TANK WEIGHT

SHELL - 961 lbs
TOP HEAD - NONE
BOTTOM HEAD - 3,205
INTERNAL BAFFLES - 529 lbs
LIQUID - 14,702
GRINDER 900

TOTAL ~ 20,298 lbs

SAFETY FACTOR 2

40,600 lbs

(4) LEGS LEG HT = 5'-7"

10,150 #/LEG

$F = n\pi^2 EI/L^2$

$4(9.9)(29{,}000{,}000)(30.9)/(67)^2$

F = 7,905,003 lbs >> 40,600 lbs

$I = \pi(d_o^4 - d_i^4)/64$

USE 6" pipe

$I = \pi(6.625^4 - 6^4)/64$

$I = 30.9$

CUSTOMER: BAE / RADFORD	JOB NO. 150326C1
SUBJECT: GRINDER FEED TANK SEISMIC - 613-T-30103, 30131	PAGE 1 OF 2
BY: JJS / DATE: 3-17-2018 / APPROVED BY:	DATE:

SEISMIC ZONE 1

$D = 10\,ft$ $\quad Z = 0.075 \quad W = 20{,}298\#$

$H = 8'\text{-}7''$ (LEG $5'\text{-}7''$) $\quad X = 7'\text{-}7'' \quad C_t = 0.035$

FUNDAMENTAL VIBRATION

$$T = C_t \times H^{0.75} = 0.035 \times (8.58)^{0.75}$$
$$= 0.176\ sec$$

$I = 1 \quad S = 1 \quad R_w = 2.9$

$$C = \frac{1.25S}{T^{2/3}} = \frac{1.25(1)}{(0.176)^{2/3}} = 3.98$$

$$V = \frac{ZIC}{R_w}W = \frac{0.075(1)(3.98)(20{,}298)}{2.9} = 2{,}089$$

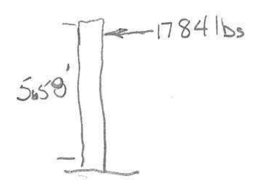
$$F_t = 0.07(0.176)(2089) = 25.7$$

$$M = 25.7 \times 8.58 + (2089 - 25.7) \times \frac{2(8.58)}{3}$$

$$M = 220.5 + 11{,}807 = 12{,}028\ ft\text{-}lbs$$

$$X > H/3$$

$$M_x = [25.7 \times 8.58 + (2089 - 25.7)(7.58 - 2.86)$$
$$M_x = 220.5 + 9739 = 9{,}960\ ft\ lbs$$



$$\text{DEFLECTION} = \frac{1784(66.96)^3}{3(29{,}000{,}000)(30.9)}$$

$$= 0.2\ in$$

	CUSTOMER: BAE / RADFORD			JOB NO. 150326C1
	SUBJECT: GRINDER FEED TANK SEISMIC 613-T-30103, 30131			PAGE 2 OF 2
	BY: JJS	DATE: 3-17-2018	APPROVED BY:	DATE:

STRESS AT BASE

$$S = \frac{Mc}{I} = \frac{9{,}960 \text{ ft lbs}}{1 \text{ ft}} \frac{(3.3125 \text{ in})\, 12 \text{ in}}{30.9 \text{ in}^4}$$

$S = 12{,}813$ psi

CUSTOMER: BAE / RADFORD	JOB NO. 150326C1
SUBJECT: MAKE-UP WATER TANK 613-T-3015	PAGE 1 OF 2
BY: JJS / DATE: 3-17-2018 / APPROVED BY:	DATE:

SERVICE - Collection of Recycle water

DIAMETER 10 ft
SS 17 ft
TOP HEAD FLAT
BOTTOM HEAD DISHED
Design Pressure - -1 psig to 10 psig
DESIGN Temperature - 0-140°F

Circumferential Stress

$$t = \frac{PR}{SE - 0.6P}$$

P = 10
R = 60
E = 0.70
S = 14000

$$= \frac{10(60)}{14{,}000(0.7) - 0.6\,10}$$

$t = 0.03$ Use 1/4"

LONGITUDINAL STRESS

$t = 0.0306$ use 1/4"

Bottom Head

ELLIPSODIAL

$$t = \frac{PD}{2SE - 0.2P} = \frac{10(60)}{(19600) - 2.6} = 0.0306''$$

USE 1/4"

CUSTOMER: BAE/RADFORD	JOB NO. 150326C1
SUBJECT: MAKE-UP Water TANK 613-T-30015	PAGE 2 OF 2
BY: JJS · DATE: 3-17-2018 · APPROVED BY:	DATE:

FLAT HEAD

NO REINFORCEMENT

$t = 120\sqrt{0.2(10)/14{,}000(0.70)}$

$t = 120\ (0.0143)$

$t = 1.7''$

USE 1/2"

$t = 33\ (0.0143)$

WITH REINFORCEMENT

USE 1/2" x 3" BARS AS CHORDS FOR HEAD EVERY 12"

TANK WEIGHT

SHELL - 5,450 lbs
TOP HEAD - 1,602 lbs
Bottom HEAD - 984 lbs
REINFORCEMENT - 410 lbs
LIQUID 88,620 lbs

TOTAL - 97,066 lbs

SAFETY FACTOR 2

194,132 lbs

(4) LEGS 6ft Long

48,533 lbs

USE W8x67

$F_{CRIT} = n\pi^2 E I / L^2$

$= 4(9.9)\ 29{,}000{,}000\ \dfrac{(88.6)}{(72)^2}$

$F_{CRIT.} = 19{,}627{,}361 >> 194{,}132$

OK

CUSTOMER: BAE / RADFORD	JOB NO. 150326C1
SUBJECT: MAKE-UP WATER TANK 613-T-3015 - SEISMIC	PAGE 1 OF 2
BY: JJS · DATE: 3-17-2018 · APPROVED BY:	DATE:

SEISMIC ZONE 1

$D = 10\,ft$ $Z = 0.075$ $W = 97{,}066\,lb.$
$H = 23\,ft$ $X = 22'\text{-}10''$ $C_t = 0.035$

FUNDAMENTAL VIBRATION

$T = C_t \times H^{0.75} = 0.37\ sec.$

$I = 1$
$S = 1$
$R_w = 2.9$

$C = \frac{1.25(s)}{T^{2/3}} = \frac{1.25}{0.514} = 2.4$

$V = \frac{ZIC}{R_w} W = \frac{0.075(1)(2.4)\,97{,}066}{2.9} = 6{,}108.7$

$F_t = 0.07(0.37)(6109) = 158.2$

$M = 158.2(23) + (6109 - 158) \times \frac{2(23)}{3}$
$3639 + 91{,}249$

$= 94{,}888\ ft\text{-}lbs$

$x > H/3$

$m_x = (158.3 \times 23) + (6109 - 158) \times (22.83 - \frac{23}{3})$
$= 3639 + 90{,}237$
$= 93{,}876\ ft\text{-}lbs$

LEGS W8x67 -- $I = 88.6\ in^4$

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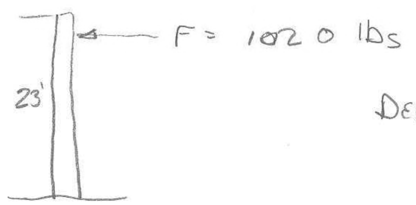
CUSTOMER: BAE/RADFORD			JOB NO. 150326C1
SUBJECT: MAKE-UP WATER TANK 613-T-3015- SEISMIC			PAGE 2 OF 2
BY: J.J.S.	DATE: 3-17-2018	APPROVED BY:	DATE:

BETWEEN (4) LEGS 23,469 ft-lb



$$\text{DEFLECTION} = \frac{1020\,(72)^3}{3(29{,}000{,}000)\,88.6}$$

$$= 0.05''.$$

STRESS at BASE

$$S = \frac{23{,}469 \text{ ft-lbs}}{1 \text{ ft}} \cdot 12 \text{ in} \cdot \frac{4}{88.7 \text{ in}^4}$$

$$= 12{,}700 \text{ psi}$$

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CUSTOMER: BAE / RADFORD	JOB NO. 150326C1
SUBJECT: DECANT TANK 613-T-30028	PAGE 1 OF 3
BY: JJS | DATE: 3/17/2018 | APPROVED BY:	DATE:

DECANT TANK - USE - FEED GRINDER TANKS

DIAMETER - 14ft
SS - 10'-3"
TOP HEAD FLAT
BOTTOM HEAD DISH
DESIGN PRESSURE -1 to 10psig
DESIGN TEMP 60-140°F

MATERIAL
304SS SA-240

CIRCUMFERENTIAL STRESS

$t = \frac{PR}{SE - 0.6P}$

P = 10 psi
R = 84 in
E = 0.70 %
S = 14,000 psi

$t = \frac{10(84)}{(14{,}000(.7)) - (0.6)(10)}$

t = 0.0858 in MAKE 1/4"

LONGITUDINAL STRESS

t = 0.0428" in use 1/4"

	CUSTOMER: BAE / RADFORD			JOB NO. 150326C1
	SUBJECT: DECANT TANK 613-T-30028			PAGE 2 OF 3
	BY: JJS	DATE: 3-17-2018	APPROVED BY:	DATE:

BOTTOM HEAD

Ellipsodial

$$t = \frac{PD}{2SE - 0.2P} = \frac{10(84)}{2(14{,}000)(0.70) - 0.2(10)}$$

$t = 0.043$ MAKE 1/4"

TOP HEAD

FLAT

$t = d\sqrt{CP/SE}$ $d = 168$

$C = 0.20$
$P = 10$
$S = 14{,}000$
$E = 0.7$

$t = 168\sqrt{0.20(10)/14{,}000(0.7)}$

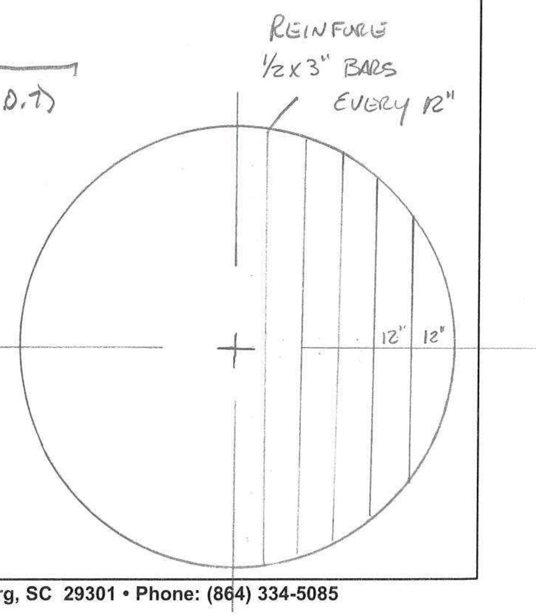
$t = 168\,(0.0143)$

$t = 2.4"$

REINFORCEMENT

$d = 35"$

$t = 0.5"$



CUSTOMER: BAE / RADFORD	JOB NO. 150326C1
SUBJECT: DECANT TANK 613-T-30028	PAGE 3 OF 3
BY: JJS / DATE: 3-17-2018 / APPROVED BY:	DATE:

WEIGHT OF TANK

SHELL - 4,600 lbs
TOP HEAD - 3,140 lbs
BOTTOM HEAD 1,810 lbs
REINFORCEMENT - 3,300 lbs
Liquid - 98,500 lbs

TOTAL = 111,350 lbs

(4) Legs - 27,840 lbs/EACH

LEGS ARE 10" SCH 80 PIPE

$I = \frac{\pi((10.75)^4 - (9.652)^4)}{64}$

$I = 229.5 \text{ in}^4$

$F_{CRIT} = n\pi^2 EI / L^2$

$= 4(9.9)(29 \times 10^6) 229.5 / (201)^2$

$F = 6,523,546 \text{ lbs} >> 111,350$ - ok.

CUSTOMER: BAE/ RADFORD			JOB NO. 150326C1
SUBJECT: DECANT TANK - SEISMIC 613-T- 30028			PAGE 1 OF 2
BY: JJS	DATE: 3-17-2018	APPROVED BY:	DATE:

SEISMIC ZONE - 1

$D = 14$ ft $\quad Z = 0.075 \quad W = 111,350$ lbs

$H = 27$ ft $\quad X = 25$ ft $\quad C_t = 0.035$

FUNDAMENTAL VIBRATION

$T = C_t \times H^{0.75} = 0.035 \times (27)^{0.75}$

$T = 0.42$ SEC

I - OCCUPANCY IMPORTANCE = 1 $\quad$ S = SITE PROFILE CHARACTERISTICS = 1

$R_w = 2.9$ (TANKS)

$$C = \frac{1.25(S)}{T^{2/3}}$$

$$= \frac{1.25(1)}{(0.42)^{.67}} = \frac{1.25}{0.559} = 2.23$$

$$V = \frac{ZIC}{R_w} W = \frac{0.075(1)2.23(111,350)}{2.9}$$

$V = 6421.8$

$F_t = 0.07(T)(V) = 0.07(0.42)(6422) = 188.8$

$$M = 188.8 \times 27 + (6421.8 - 188.8) \times \frac{2(27)}{3}$$

$= 5098 + 112,180$

$= 117,278$ ft lbs

CUSTOMER: BAE / RADFORD			JOB NO.
SUBJECT: DECANT TANK - SEISMIC 613-T-30028			PAGE 2 OF 2
BY: JJS	DATE: 3-17-2018	APPROVED BY:	DATE:

$X > H/3$

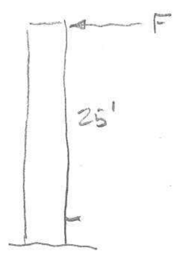
$$m_X = \left[F_t \times H + (V - F_t) \times (X - H/3)\right]$$

$$= (188.8 \times 27) + (6422 - 189)\left(25 - \tfrac{27}{3}\right)$$

$$= 5098 + (6233)(16)$$

$$= 104,826 \text{ Ft-lb}$$

BETWEEN (4) LEGS = 26,207 ft-lbs



$F = 26,207 \text{ ft-lbs} / 25 \text{ ft}$

$F = 1,048 \text{ lbs}$

DEFLECTION - $\dfrac{PL^3}{3EI} = \dfrac{1048 \text{ lbs } (201)^3 \text{ in}^3}{3(29,000,000)\ 230}$

$= 0.425 \text{ in}$

STRESS AT BASE

$S = \dfrac{M\ c}{I}$

$M = 26,207$ ft-lbs
$C = 5.375''$
$I = 230 \text{ in}^4$

$S = \dfrac{26,207 \text{ ft lbs}}{1 \text{ ft}} \cdot \dfrac{12 \text{ in } (5.375) \text{ in}}{230 \text{ in}^4} = 7,349 \text{ psi}$

"IBC2006E.xls" Program
Version 1.0

SEISMIC BASE SHEAR AND OVERTURNING MOMENT

Per IBC 2015 and ASCE 7-10 Specifications

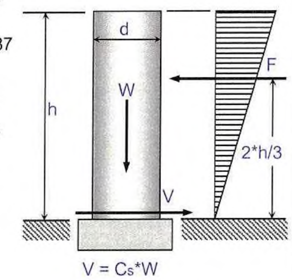
For Ground Supported Vertical Cylindrical Tanks, Vessels, and Stacks

Job Name:	BAE Radford - Energetic Waste Incinerator	Subject:	Seismic Overturning		
Job Number:		Originator:	TEW	Checker:	

Secondary Containment Tank

Input Data:

Occupancy Category =	IV	IBC 2015, Table 1604.5, page 357
Importance Factor, I =	1.50	ASCE 7-10 Table 1.5-2, page 5
Soil Site Class =	D	IBC 2015 Table 1613.3.2, page 387
Location Zip Code =		
Spectral Accel., Ss =	0.251	ASCE 7-10 Figures 22-1 to 22-14
Spectral Accel., S_1 =	0.085	ASCE 7-10 Figures 22-2 to 22-14
Long, Trans. Period, T_L =	4.000	sec. ASCE 7 Fig's. 22-12 to 22-16
Tank/Vessel Height, h =	20.000	ft. Use TL = 4 (Note d,
Tank/Vessel Diameter, d =	13.750	ft. page 153)
Wall Thickness, t =	0.3750	in.
Tank Mat'l. Unit Wt., ρt =	490	pcf
Tank Elastic Modulus, E =	2900	ksi
Roof Weight, Wr =	8.00	kips
Shell Weight, Ws =	14.00	kips
Bottom Weight, Wb =	5.00	kips
Contents Unit Weight, ρc =	62.40	pcf
Height of Contents, hp =	18.500	ft.
Contents Weight, Wp =	169.86	kips
Liquid Contents?	Yes	
Structural System =	7a	Flat bottom, ground supported tanks - steel or fiber-reinforced - mechanically anchored (ASCE 7-10 Table 15.4-2)



Seismic Base Shear

Results:

Site Coefficients:

Fa =	1.599	IBC 2015 Table 1613.5.3(1), page 304
Fv =	2.400	IBC 2015 Table 1613.5.3(2), page 304

Maximum Spectral Response Accelerations for Short and 1-Second Periods:

SMS =	0.401	SMS = Fa*Ss, IBC 2015 Eqn. 16-37, page 303
SM1 =	0.204	SM1 = Fv*S1, IBC 2015 Eqn. 16-38, page 303

Design Spectral Response Accelerations for Short and 1-Second Periods:

SDS =	0.268	SDS = 2*SMS/3, IBC 2015 Eqn. 16-39, page 304
SD1 =	0.136	SD1 = 2*SM1/3, IBC 2015 Eqn. 16-40, page 304

Seismic Design Category:

Category(for SDS) =	C	IBC 2015 Table 1613.5.6(1), page 306
Category(for SD1) =	D	IBC 2015 Table 1613.5.6(2), page 306
Use Category =	D	Most critical of either category case above controls

Fundamental Period:

T =	0.034	sec., T = 0.00000765*(h/d)^2*(W*1000/h*d/(t/12))^(1/2)
Rigid or Flexible?	Rigid	Criteria: If T < 0.06, then Rigid, else if T >= 0.06, then Flexible

Seismic Design Coefficients and Factors:

Response Mod. Coef., R =	3	ASCE 7-10 Table 15.4-2, page 163
Overstrength Factor, Ωo =	2	ASCE 7-10 Table 15.4-2, page 163
Defl. Amplif. Factor, Cd =	2.5	ASCE 7-10 Table 15.4-2, page 163

(continued:)

"IBC2006E.xls" Program
Version 1.0

Seismic Base Shear: (using ASCE 7-10 procedure "a" or "c", page 152)

Assume tank/vessel and contents as a combined rigid mass

Total Weight, W =	196.86	kips ASCE 7-10 Section 15.4.3
Cs =	0.134	Cs = SDS/(R/I), ASCE 7-10 Section 12.8.1.1, Eqn. 12.8-2
CS(max) =	N.A.	For T<=TL, CS(max) = SD1/(T*(R/I)), ASCE 7-10 Eqn. 12.8-3
CS(min) =	0.030	Cs(min) = 0.044*SDS*I >= 0.03, ASCE 7-10 Eqn. 15.4-1
Use: Cs =	0.134	CS(min) <= CS <= CS(max)
Seismic Base Shear, V =	23.71	kips, for Rigid: V = 0.30*SDS*W*I, ASCE 7-10 Eqn. 15.4-5

Seismic Shear Vertical Distribution: (using ASCE 7-10 procedure "a" or "c", page 152)

Cvx =	N.A.	Cvx = Wx*hx^k/(ΣWi*hi^k) = 1.0, ASCE 7-10 Eqn. 12.8-12, page 130
Force at 2*h/3, F =	N.A.	kips, F = Cvx*V, ASCE 7-10 Section 12.8.3, Eqn. 12.8-11, page 130

Overturning Moment at Base: (using ASCE 7-10 procedure "a" or "c", page 152)

Mo =	250.37	ft-kips, Mo = Cs*(Wr*h+Ws*h/2 +Wp*hp/2) (at top of foundation)

Seismic Base Shear (including sloshing): (using ASCE 7-10 Section 15.7.6 and API 650 Appendix E

Ci =	6.74	Ci = from API 650 Appendix E, Fig. E-1
Ti =	0.126	sec., Ti = 1/27.8*Ci*hp*SQRT(ρc/E)/SQRT(t/D), API 650 Appendix E
Ts =	0.508	sec., Ts = SD1/SDS, ASCE 7-10 page 64
Tc =	2.140	sec., Tc = 2*π*SQRT(d/(3.68*g*TANH(3.68*hp/d))), Eqn. 15.7-12
Sai =	0.268	Sai = SDS, for Ti <= Ts, ASCE 7-10 Eqn. 15.7-7
Sac =	0.095	Sac = 1.5*SD1/Tc <= 1.5*SDS, for Tc <= TL, ASCE 7 Eqn. 15.7-10
Wi =	142.34	Wi = (1-0.218*d/hp)*Wp, API 650 Appendix E
Wc =	29.03	Wc = (0.23*d/hp*TANH(3.67*hp/d))*Wp, API 650 Appendix E
C1 =	0.134	C1 = Sai/(R/I), ASCE 7-10 Eqn. 15.7-5
Vi =	22.66	kips, Vi = C1*(Wr+Ws+Wb+Wi), ASCE 7-10 Eqn. 15.7-5
C2 =	0.095	C2 = Sac*I/1.5, ASCE 7-10 Eqn. 15.7-6
Vc =	2.77	kips, Vc = C2*Wc, ASCE 7-10 Eqn. 15.7-6
Per ASCE 7, V =	25.42	kips, V = Vi + Vc, ASCE Eqn. 15.7-4, page 152
Per ASCE 7 (SRSS), V =	22.83	kips, V = SQRT(Vi^2 + Vc^2), ASCE Sect. 15.7.6.1 Note "e", p. 153
Per API 650, V =	19.07	kips, V = Ai*(Wr+Ws+Wb+Wi)+Ac*Wc, API 650 Appendix E
Per API 650 (SRSS), V =	17.12	kips, V = SQRT((Ai*(Wr+Ws+Wb+Wi))^2+(Ac*Wc)^2), API 650 App. E

Overturning Moment at Fdn. (including sloshing): (using ASCE 7-10 Sect. 15.7.6 and API 650 App. E

Xs =	10.000	Xs = h/2 (assumed), API 650 Appendix E
Xis =	10.075	Xis = (0.5+0.06*d/hp)*hp, API 650 Appendix E
Xcs =	14.857	Xcs = (1-(COSH(3.67/(d/hp))-1.9375)/(3.67/(d/hp)*SINH(3.67/(d/hp))))*hp
Rwi =	4.00	Rwi = from API 650 Appendix E, Fig. E-4 (mechanically-anchored)
Rwc =	2.00	Rwc = from API 650 Appendix E, Fig. E-4 (mechanically-anchored)
K =	1.50	K = 1.5 (assumed) from API 650 Appendix E, Section E.2.2
Ai =	0.100	Ai = max. of: SDS*I/Rwi and 0.007, API 650 Appendix E
Ac =	0.071	Ac = K*SD1*1/Tc*I/Rwc, API 650 Appendix E
Per ASCE 7, Mo =	273.13	ft-kips, Mo = C1*(Wr*h+Ws*Xs+Wi*Xis)+C2*Wc*Xcs
Per ASCE 7 (SRSS), Mo =	204.85	ft-kips, Mo = SQRT((C1*(Wr*h+Ws*Xs+Wi*Xis))^2+(C2*Wc*Xcs)^2)
Per API 650, Mo =	235.63	ft-kips, Mo = Ai*(Wr*h+Ws*Xs+Wi*Xis)+Ac*Wc*Xcs
Per API 650 (SRSS), Mo =	176.72	ft-kips, Mo = SQRT((Ai*(Wr*h+Ws*Xs+Wi*Xis))^2+(Ac*Wc*Xcs)^2)

(Note: Mo is the overturning moment at top of foundation.)

Comments:

Project Integration, Inc.

Memo

To: Mary McCoy,
Environmental Manager BAE Systems Radford Army Ammunitions Plant

From: John J. Sudnick

CC: Project File 150326C1 -Correspondence to Customer

Date: April 22, 2018

Re: RCRA Hazardous Waste Tank Materials of Construction

The primary constituents of the Hazardous Waste treated at the Radford Army Ammunitions Plant (RAAP) consist of the components listed in Table 1.

Table 1

COMPONENT	CHEMICAL RESISTANCE OF 304 STAINLESS STEEL
Nitrocellulose	Good
Nitroglycerin	Good (in solvent or water solutions with concentrations of 50% or less.
Candellia Wax	Excellent
d-normal propyladipate	Good
2-nitrodiphenylamine	Good
triacetin	Excellent
Salicylic acid	Excellent
Resorcylic Acid	Good
Ethyl Cellulose	Good
Elba Solvent	Good
Potassium Nitrate	Fair
Ethyl Centralite	Good
Dinitrotoluene	Excellent
dibutyl phthalate	Excellent
diphenylamine	Good
Potassium Sulfate	Excellent
N-Butyl Stearate	Good
Lead Carbonate	Fair

Research(1) was done on the chemical resistance of 304 stainless steel to these compounds and the results are also shown in Table 1.

The tank material selection was made based on this research and over 40 years of proven experience in handling explosive slurry at RAAP. Vessels and piping containing explosive slurry and nitrocellulose slurry with greater than one percent solids and less than one half percent acid are constructed of 304 stainless steel (A-240 plate for the

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tanks and A-312 pipe). RAAP has historically used these materials in production and waste handling processes with great success. The hazardous waste tanks for the hazardous waste disposal facility will use the same proven materials for the construction of the tanks.

(1)Resources consulted:

(1) National Association of Corrosion Engineers
(2) Sandvik Materials Technology
(3) BASF Corporation
(4) Dow Chemical
(5) Historical testing data from RAAP

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Appendix IV.Aa-2 - Secondary Containment Calculations

Coterie ENVIRONMENTAL
1150 First Ave., Suite 501
King of Prussia, PA 19406
610-945-1777

Client: BAE-RFAAP
Project: EWI-CWP
Subject: Secondary Containment Calcs.
Performed By: MEG Date: 06.05.18
Checked By: Date:

VOLUME OF SUMP

REFERENCE DRAWINGS:
0613.00-69432-F352.00 : FOUNDATION SLAB/PLAN
0613.00-69436-F354.00 = SECTIONS & DETAILS (S2+3)

RECTANGULAR SUMP: 6' × 6' × 4'
VOLUME = L · B · H

VOLUME = 6 × 6 × 4 = 144 FT^3
= 1,077 GALLONS (1)

VOLUME OF TRENCHES

REFERENCE DRAWINGS:
0613.00-69432-F352.00 = FOUNDATION SLAB/PLAN
0613.00-69435-F354.00 = SECTIONS & DETAILS (S6+7)
0613.00-69416 - F355.00 = FIRST FLOOR PLAN
THREE TRENCHES
1. WIDTH OF BUILDING:
LENGTH = 117' 1.5" WIDTH = 16" DEPTH = 12"
2. LENGTH OF BUILDING: (2)
LENGTH = 81' 1.5" WIDTH = 12" DEPTH = 12"

VOLUME #1 = L × B × H
= 16" × 12" × 117' 1.5"
= 269,856 IN^3
= 156.17 FT^3

VOLUME #2 = 2 × L · B · H
= 2 × 12 × 12 × 81' 1.5"
= 280,368 IN^3
= 162.25 FT^3

TOTAL
156.17
+ 162.25
= 318.42 FT^3
= 2,382 GAL (2)

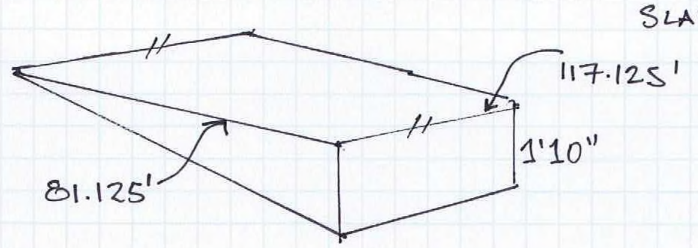
Page 1 of 2

Coterie ENVIRONMENTAL
1150 First Ave., Suite 501
King of Prussia, PA 19406
610-945-1777

Client: BAE-RFAAP
Project: EWI-CWP
Subject: Secondary Containment Calcs.
Performed By: MEG Date: 06.05.18
Checked By: Date:

VOLUME OF SLOPE

REF DRAWING: 0613.00-69432-F35200 FOUNDATION SLAB PLAN



VOLUME: $\frac{1}{2} \cdot B \cdot H \cdot L$

$= 0.5 \times 117.125' \times 1'10" \times 81.125'$

$= 13{,}966{,}268$ IN³

$= 8{,}709.95$ FT³

$= 65{,}155$ GALLONS

TOTAL VOLUME:

$VOL_{SUMP} + VOL_{TRNCH} + VOL_{SLP} = VOL_{TOT}$

1 2 3

1,077 GAL + 2,382 GAL + 65,155 GAL

$\boxed{= 68{,}614 \text{ GALLONS}}$

Page 2 of 2

Attachment IV.B - Storage and Treatment Tank Operation

IV.B.1 General

The waste containers are brought to either Building 430 or Building 442 to be staged for incineration. The containers are transported to the Grinder Building 442 and loaded onto the trolley conveyor. The conveyer transports the containers above the grinder where their contents are discharged into the grinder. The inverted containers are automatically washed with water sprays flushing the remainder of the reactive waste into the grinder. The material that enters the grinder is then ground and mixed with water to form a slurry for incineration.

The spray or make-up water can be plant utility water or solid waste water having concentrations of diethylene glycol (DEG) and/or triethylene glycol (TEG) as specified in the Waste Analysis Plan, Attachment II.B, (see Module II).

The waste energetics are cut in the grinder and must pass through the sizing screen before exiting the grinder. The ground material discharges into one of the two slurry tanks (T-1A or T-1B) based on tank inventory.

Make-up water, TEG/DEG water, and/or decanted water is added to a preselected slurry tank along with the ground waste to generate the slurry batch. The slurry is continually agitated by the tank impeller. The slurry is also pumped from the tank bottom and returned to the tank top (i.e., “interior” recirculation) or to the other slurry tank to further increase mixing. The turbulence of the agitation is controlled by adjusting the impeller angular velocity. The inventory level is continuously monitored and automatically controlled.

There are both “interior” and “exterior” slurry recirculation systems. The interior recirculation system pumps waste slurry from the tank bottom and back to the top of the same tank. Slurry circulating in this loop passes through a density meter that provides a continuous indication of the thickness of the slurry. A high density indicates a thick slurry, which may plug the recirculation systems. A low density requires an increase in auxiliary fuel consumption and restricts the incinerators’ operational capacity.

Once the desired slurry mix is achieved, the slurry is directed from the interior to the exterior recirculation loop. The slurry feed pump located in the Grinder Building pushes the slurry through the exterior recirculation flow loop (located on the pipe rack, approximately 20 feet above ground). The loop supplies either or both incinerators with slurry on a continuous basis.

The slurry pressure and flow rate in the exterior loop are continuously monitored. High pressure and low flow are an indication of pipeline blockage, which must be cleared immediately to protect personnel and equipment. Low pressure and low flow conditions automatically activate an alarm and provide an indication of a ruptured loop pipe or a pump failure. When the alarm is activated, the operator must immediately survey the control panel to observe level movement in the slurry tank and electrical status of the pump. If operations appear to be abnormal then immediate corrective action is required.

When an electrical power outage occurs, the slurry metering pump will stop pumping slurry to the incinerator, and the exterior slurry recirculation system will automatically flush with emergency plant water to flush the residual slurry in the exterior loop back to the slurry tanks. Only when electrical power (either from the plant or an emergency generator) is restored and the incinerator is operating normally will the residual slurry from the metering pump be flushed forward into the kiln.

IV.B.2 Inspections

The tanks and ancillary equipment will be inspected as outlined in the Inspection Schedule, Attachment II.C (see Module II). At least once each operating day, the following items shall be inspected:

a. The slurry tank system (T-1A and T-1B) to detect external and internal corrosion, structural integrity, or leaking of waste;

b. Data gathered from continuous monitoring equipment to ensure that the tank system and the secondary containment system is being operated according to its design;

c. Construction materials, the area immediately surrounding the externally accessible portion of the tank system, and the secondary containment system to detect erosion or signs of leakage;

d. Above ground piping for leaks;

e. Pumps and seals for leaks and seal water flow rates; and

f. Pressurized above ground piping system for leaks (internal and external recirculation systems).

IV.B.3 Spills or Leaks From Tank Systems

The following sections provide a description of the practices employed for managing the waste slurry in the tank system. Procedures for preventing and responding to spills and leaks are discussed.

IV.B.3.a Tank Management Practices

Controls and practices in the Grinder Building are designed to prevent overfilling of slurry tanks. High level alarms for the tanks are provided in the unit control system. In the event of a tank overfill, the slurry will flow through a 6-inch pipe to the makeup water tank. If any slurry spills onto the floor, it drains to floor sumps 4A and 4B and is then pumped to an outside catch tank 8B. The catch tank contents will either be directed back to the makeup water tank or will be pumped into an accumulation tank truck trailer depending on the inventory of material in the makeup water tank. The truck contents will then either be returned to the makeup water tank or will be managed in the facility wastewater treatment system. Any collected solids from spilled slurry will be accumulated in waste propellant containers and managed as hazardous waste in full accordance with all applicable sections of the VHWMR requirements.

The area surrounding each of the tanks is adequate to provide for maintenance and inspection requirements on the open tanks. At least once each operating day, the emergency shutdown controls, liquid level monitoring device, the alarm system and other control equipment are inspected to ensure that the tanks are in good working order. See the Inspection Schedule, Attachment II.C (see Module II) for more details on tank inspection.

IV.B.3.b Procedures to Prevent Spills or Leaks

Hazardous wastes or treatment reagents will not be placed in the tank system if they could cause the tanks, their ancillary equipment or the containment system to rupture, leak, corrode, or otherwise fail. Slurry spillage or leakage from operation or maintenance shall be managed in accordance with standard incinerator operating procedures. The spilled or leaked material will be collected in less than 26-gallon containers and treated at either the open burning ground or the incinerators after the cause for the spill has been corrected.

The following controls and practices will be utilized to prevent spills and overflows from the tanks or containment system:

i. Spill prevention controls (check valves);

ii. Overfill prevention controls (continuous level monitoring, high level alarm, bypass to the makeup water tank); and

iii. Maintenance of sufficient freeboard in the tanks to prevent overtopping.

IV.B.3.c Response to Spills or Leaks and Disposition of Leaking or Unfit for Use Tank Systems

In the event of a slurry tank overfill, slurry recycle loop pipe rupture, or pump casing failure that could impact human health or the environment, the procedure to manage a reactive slurry spill will be implemented in accordance with the protocols delineated in the Contingency Plan, Attachment II.E (see Module II). The spilled or leaked materials will be collected, placed into hazardous waste containers and accumulated on-site for less than 90 days. The liquid hazardous waste will drain to the catch tank and will be managed in accordance with the VPDES Permit or will be shipped off-site to an appropriately permitted facility.

If there is a leak or spill from the tank systems or the secondary containment system, or if the system is unfit for use, it will be removed from service immediately. If there is a potential for the problem to impact human health or the environment, the Permittee must follow the procedures set forth in the Contingency Plan, Attachment II.E.

If the tank system is unfit for repair, it will be cleaned according to the Closure Plan, Attachment II.F (see Module II) and disposed of according to Army policy and the VHWMR.

Attachment IV.Ba - Storage and Treatment Tank Operation for the EWI-CWP Complex

IV.Ba.1. General

The rotary kiln incinerators that are used to treat a portion of the facility's hazardous energetic wastes cannot process the hazardous waste in the form in which it is generated by the processes. These wastes must first be reduced in size and mixed with ample amounts of water to allow them to be safely thermally treated. Once properly reduced in size and mixed with water, the wastes are stored in tanks before being processed in the rotary kiln incinerators. Piping and instrumentation diagram (P&IDs) provide a detailed review of the process, the associated instrumentation, and controls. The P&IDs are maintained on-site and available for inspection upon request. The sections that follow provide a stepwise description of each process.

IV.Ba.1.a. Grinding Operations

The first step in the treatment and storage tank operations is the grinding process. This process is conducted to both reduce the size of the wastes for thermal treatment and to create a stable slurry mixture of water and propellant that is less likely to experience a reaction or be affected by a reaction elsewhere in the process.

Studies conducted at the RFAAP have shown that the energetic wastes, when mixed at a ratio of three parts water to every one part of propellant, will not detonate or propagate. Studies of the size reduction process have shown that performing the size reduction under a deluge of water (at ratios of at least 10 parts water for every one part propellant) significantly reduces the risk of an incident (fire or explosion) in the size reduction process. Note that each of these limitations (the 10:1 for grinding and 3:1 for burning) are safety limitations not environmental limitations.

The following provides a step-by-step description of the grinding operations:

Step 1: Wastes are selected from those stored in the various central accumulation areas throughout the plant to create a "grind" or batch. Factors considered when making each grind are the 90-day expiration date of the wastes, the chemical composition of the waste (as it impacts feed rate compliance), and the amount of materials stored in a central accumulation building relative to the capacity of that accumulation building.

Step 2: The selected wastes are brought to the Grinder Building and placed into the marked-off area on the operation floor. Each tub of waste is then visually inspected and if no obvious foreign object debris (FOD) or other issues are noted, the wastes are loaded onto an incline conveyor and passed through a metal detector. Those tubs of waste that do not register any metal contamination are then tipped and loaded onto the waste bucket conveyor. This process continues until all 64 buckets on the conveyor are filled with a bag of hazardous waste.

Step 3: The operators do a final walk-through of the building and return to the operations control center (OCC, Building 610).

Step 4: The operator in the OCC performs a final check on the grinder system components and proceeds to load the amount of water required for the grind into the Decant Tank (613-T-30028). This tank holds the amount of water required to ensure a 10:1 ratio of water to propellant during the grinding operation. Water for the Decant Tank can either come from the process water supply line, the slurry tank decant system, or the Makeup Water Tank (613-T-30015). The source and amount of each type of supply is accounted for in the control system.

Step 5: The operator selects which Grinder process is being utilized and sets up the waste feed conveyor and decant water system to supply water and waste to the selected process. (Note that there are two identical grinder operations included in the Grinder Building, one processing through Grinder Tank 613-T-30103 and one processing through Grinder Tank 613-T-30131).

Step 6: The operator initiates the grinding process, water flow begins, and the waste conveyor begins unloading waste bags into the selected Grinder tank. The operation proceeds, moving at the rate of one bag approximately a minute, until all 64 bags have been unloaded and processed through the Grinder system.

Step 7: Once in the Grinder tank, each waste bag processes through the first cutting stage (Grinder 613-G-30106 or 613-G-30134) and then the second cutting stage (Cutter 613-G-30110 or 613-G-30144). The resultant sized-reduced energetic material, now suspended in a mixture of water at a 10:1 ratio, is then directed to one of the slurry tanks (613-T-30079, 613-T-30164, or 613-T-30197).

IV.Ba.1.b. Waste Storage Operations

Once the 10:1 waste slurry is transferred into one of the kiln feed storage tanks, it is stored there until the operator elects to feed it to one or both of the rotary kiln incinerators. Immediately after being transferred into the tank, excess water is decanted from the slurry, reducing the mixture to a 3:1 ratio for processing.

(While grinding material at a 10:1 ratio is safe, burning at a 10:1 ratio would be extremely energy intensive. Reducing the mixture to thicker, yet safe ratio for burning increases processing efficiencies and decreases natural gas usage).

The decant process is managed remotely from the OCC and is controlled automatically once initiated. Once this process is complete, a water spray system in the tank will activate, spraying down the walls to remove any energetic materials that are stuck to the upper sides of the tank. A mechanical agitator will then be started to maintain the homogeneity of the slurry while it is being stored in the tanks.

IV.Ba.1.c. SWECO Operations

In the event that the rotary kiln system in unable to process hazardous waste, the Grinder Building has been provided with a secondary means to safely package the hazardous wastes for offsite shipment. This SWECO vibratory separation process utilizes all of the equipment referenced in the aforementioned grinding operations. Wastes are ground, slurried, and transferred to one of kiln feed storage tanks. However, instead of transferring the slurried energetic waste to the incinerators, a special spool piece will be installed in the kiln feed recirculation lines. This spool piece will direct the slurry from the recirculation piping to the SWECO vibratory separator. The SWECO system will then separate the water from the propellant and transfer the wetted propellant to a fiberboard drum that can then be safely shipped offsite. The water discharge from the SWECO will be directed to the Grinder Building sump system and pumped back to the Makeup Water Tank.

IV.Ba.1.d. Rocket Grain Cutting Operations

Some of the wastes generated at the RFAAP are large, cylindrical rocket grains. Off-specification grains must be destroyed at the EWI-CWP complex. Generally, these wastes will be directed to the Contained Burn Chamber (CBC) and therefore, will not need to be processed in the Grinder Building. However, in the event that the CBC is inoperable, and grains need to be destroyed, they will have to be ground and processed in the rotary kiln incinerators. Unfortunately, the size of these grains prohibits their direct processing in the Grinder system. Prior to processing, the grains must be cut down into manageable pieces that the grinders can process.

The actual cutting or “sawing” operations occur onsite using a specially designed wet saw that can safely cut the grains. This process is considered a size-reduction process and does not alter the generation date of the waste – the 90-day clock for the waste begins when it is first generated and does not reset after completion of the cutting operation. Regardless of whether the grains are treated in the CBC or cut and treated through the grinder and incinerator operations, they will be destroyed within 90 days of their original designation as a hazardous waste.

IV.Ba.2. Inspections

The tanks and ancillary equipment will be inspected as outlined in the Inspection Schedule, Attachment II.Ca (see Module II). At least once each operating day, the following items shall be inspected:

a. The permitted hazardous waste tanks to check for signs of corrosion or erosion, verify structural integrity, and make sure there is sufficient freeboard in the tanks and no leaking of waste from the tanks or ancillary piping;

b. Data gathered from continuous monitoring equipment to ensure that the tank system and the secondary containment system is being operated according to their design;

c. The secondary containment system to check for cracks, gaps, or other types of damage, and to verify the absence of materials in the secondary containment system; and

d. Above ground piping, pumps, and seals to make sure there are no leaks of hazardous waste and that all seals and connections are in good repair.

IV.Ba.3. Spills or Leaks from Tank Systems

The following sections provide a description of the practices employed for managing waste in the permitted tank systems. Procedures for preventing and responding to spills and leaks are discussed.

IV.Ba.3.a. Tank Management Practices

Various controls and operating practices have been designed into the Grinder Building to prevent overfilling of any of the permitted hazardous waste tanks. Each tank is equipped with two types of level measurement devices and alarms to warn operators as the height of liquid in the tank rises above acceptable levels.

For the each of the kiln feed storage tanks, any type of overflow is prevented first by the design of the tanks; each tank is a fixed-roof style tank. However, trying to fill the tanks beyond capacity will cause issues elsewhere in the system. Therefore, each tank is equipped with dual level measurement devices. The primary level measurement device is a non-contact radar sensor that transmits the level of liquid in the tank back to the control room. Primary warning of high level is provided when the liquid level reaches approximately 85 percent of the tank's design capacity. Secondary warning is provided if that level continues to rise and reaches 92 percent of the tank's design capacity. In addition to the radar sensor, each tank is also equipped with a vibronic level switch. The switch is included as a performance influencing factor (PIF) for the management of safety risks in the system. No actual overflow of the tanks can occur as they are fixed roof type tanks.

The Makeup Water Tank is also a fixed-roof style tank and, therefore, cannot overflow. However, dual level measurement is provided to prevent the tank from being filled to its capacity. Both instruments are radar sensors. An interlock is provided on one of the sensors to automatically stop the flow of material into the tank if the level reaches 90 percent of the design capacity.

The Decant Water Tank is equipped with three level sensors to both protect from overfilling, as well as to protect the tank level from running too low and creating a hazardous situation for the grinding operations. Each of the level sensors are radar-style detectors. Primary warning of high level is provided when the level measured with the controlling sensor reaches approximately 80 percent of the tank's design capacity. Secondary warning is provided if that level continues to rise and reaches 90 percent of the tank's design capacity on either the primary or secondary level sensor. At triggering of this high-high level on either sensor, flow into the tank will be automatically stopped.

For the grinder feed tanks, the primary level control is also provided by a transmitting radar sensor. Should the level measured by this instrument reach within one-inch of the top of the tank, the water flow and waste feed into the tank will be automatically stopped. A secondary, PIF-based level transmitter is also provided. The radar sensor provides early warning of tank level rise to the operator, alarming if the water level reaches six inches below the top of the tank. As these are open top tanks, the potential does exist for them to overflow. Any such overflow would drain to the Grinder Building sump and trench drain. Any excess water not held by these containment areas would be collected within the lower section of the sloped floor and retained within the building. (The secondary containment capacity of the Grinder Building far exceeds the 1,762-gallon capacity of each grinder tank).

Calibration of each of these level sensors is performed following manufacturer's recommendations. In addition, at least once a month, the emergency shutdown controls and the alarm system are tested to make sure that they are in good operating order. See the Inspection Schedule, Attachment II.Ca (see Module II) for more details on tank inspection.

IV.Ba.3.b. Procedures to Prevent Spills or Leaks

Hazardous wastes or treatment reagents will not be placed in the tank system if they could cause the tanks, their ancillary equipment or the containment system to rupture, leak, corrode, or otherwise fail. Waste spillage or leakage from operation or maintenance shall be managed in accordance with standard operating procedures for the area. The spilled or leaked material will be collected in less than 20-gallon containers and treated at one of the thermal treatment units within the complex after the cause for the spill has been corrected.

The following controls and practices will be utilized to prevent spills and overflows from the tanks or containment system:

i. Spill prevention controls (instrumentation and check valves);

ii. Overfill prevention controls (continuous level monitoring, high level alarms, and automatic interlocks); and

iii. Maintenance of sufficient freeboard in the tanks to prevent overfilling or overtopping.

IV.Ba.3.c. Response to Spills or Leaks and Disposition of Leaking or Unfit for Use Tank Systems

In the event of a tank overflow, piping rupture, or pump casing failure that could impact human health or the environment, the procedure to manage a hazardous waste spill will be implemented in accordance with the protocols delineated in the Contingency Plan, Attachment II.Ea (see Module II). If inside the Grinder Building, the spilled or leaked materials will be pumped to the makeup tank. If the makeup tank is the source of the failure, the materials will be placed into hazardous waste containers and accumulated onsite for no more than 90 days. If possible, the materials will be used in another grind or will be thermally treated in the CBC.

If there is a leak or spill from the tank systems or the secondary containment system, or if the system is unfit for use, it will be removed from service immediately. If there is a potential for the problem to impact human health or the environment, the Permittee will follow the procedures set forth in the Contingency Plan, Attachment II.Ea.

If the tank system is unfit for repair, it will be cleaned according to the Closure Plan, Attachment II.Fa (see Module II) and disposed of according to Army policy and the VHWMR.

Attachment IV.C - Procedures for Handling Reactive Wastes in Tanks

IV.C.1. Prevention of Reaction of Ignitable, Reactive, or Incompatible Wastes

The hazardous wastes managed at the permitted treatment and storage area are waste energetic materials from the RFAAP. The waste energetics may exhibit the hazardous characteristics of ignitability (D001), reactivity (D003), and/or toxicity (D004-D011, D030). All wastes are of a similar chemical nature and are compatible with each other. Upon loading of the wastes into the tanks, the solid energetic wastes are mixed with water to form a slurry mixture that is not reactive or ignitable. All subsequent handling of this waste mixture is conducted in accordance with 40 § CFR 264.17 as required by 40 CFR § 264.198.

The waste energetics are capable of detonation or explosive reaction if subjected to a strong initiating source or if heated under confinement. A source of published documentation that identifies the reactivity of these wastes is provided in "*Dangerous Properties of Industrial Materials*," by N. Irving Sax (5th Edition, see dinitrotoluene (DNT), p.619-620 and nitrates p. 853). The sections below outline the Permittee' approach to storing and treating these reactive hazardous waste.

IV.C.2. Precautions to Prevent Ignition or Reaction of Reactive Wastes

All propellant manufacturing, storage, testing, and support activities (except administration) are included in limited access areas of the facility. Information signs warning against smoking and the introduction of flame-producing devices are displayed at all normally used entrances to the limited areas. A security guard stops each entering vehicle and requests all flame producing devices in the vehicle. In addition, "Unauthorized Personnel Keep Out" signs have been placed at the Grinder Building and the two incinerators. Signs that read "DO NOT GO WITHIN 50 FT. OF INCINERATOR WHILE RED LIGHT IS ON" are posted at the entrance to each incinerator. All visitors are required to checkin at the incinerator control room before entering the area.

RFAAP has several operating procedures aimed at preventing ignition or reaction of the waste energetic materials. Sparks are avoided at the hazardous waste facilities by requiring all of the operating personnel to wear conductive shoes when involved with energetic waste operations. Heat or spark producing, electrically powered, or impact tools required for maintenance are permitted in operating buildings only with written permission.

In addition to these procedures, one of RFAAP's maintenance operating procedures is to assure that the application of a maintenance product (e.g., adhesive, lubricant, solvent, etc.) will not result in a heat-producing chemical reaction when in contact with the energetic materials. All products to be used by maintenance personnel that have not been proven compatible must be assured by laboratory testing.

IV.C.3. Preventive Procedures Structures, and Equipment

Hazards in the unloading operations, loading, and handling operations at the Grinder Building will be minimized through implementation of safety precautions included in the facility operating procedures and employee training.

Once the waste propellant containers have safely arrived at the Grinder Building, the contained energetic materials are ground and added to the slurry tanks. In these tanks, the ground energetics materials are mixed with water to form a slurry that is no longer ignitable or reactive. This slurry is then transported to the incinerators through pipelines. All control of these operations is provided remotely in the incinerator control room. With the exception of certain emergency scenarios (*e.g.*, plugged piping or pipeline breaches), there is no personnel interaction with the wastes once they are ground and loaded into the slurry tanks.

The tanks themselves are situated such that a reaction within them will be localized to the Grinder Building or the area immediately around it. The tanks are designed such that they provide adequate protective distances between the waste management area and any public ways, streets, alleys, or an adjoining property line that can be built upon.

IV.C.4. Management of Reactive Wastes in Tanks

The wastes are transported to the Grinder Building (Building No. 442) where they are ground and mixed with water to form a slurry. Experimental test results given in the final report entitled “Evaluation of Burning H-6 Propellant in the Waste Propellant Incinerator,” (Production Engineering Project PE-543, November 20, 1975) have shown for a variety of propellants and explosives this aqueous slurry will provide a suitable combustible and/or explosive transport medium. The aqueous slurry also serves as an effective suppressor to flame or explosive shock. The water will prevent localized initiations that could occur during normal or abnormal operating conditions and that would result in a sustained burning reaction or explosion. The wastes are piped over to the incinerators in a slurry form and injected into the incinerator.

The incinerators are operated remotely from the main control room. Personnel will not come in direct contact with the slurry mix since it is a remote operation and all slurry is in an enclosed recirculating system. In order to prevent settling in the lines, the slurry is continuously recirculated through the exterior recirculation loop. When the incinerators are in operation, a portion of this flow is directed through the pickup line and metering pump to the incinerator. Continuous operation of the loop ensures good circulation in all lines and prevents the possibility of accumulation of solids in critical areas.

Attachment IV.Ca - Procedures for Handling Reactive Wastes in Tanks for the EWI-CWP Complex

IV.Ca.1. Prevention of Reaction of Ignitable, Reactive or Incompatible Wastes

The hazardous wastes managed in tanks at the EWI-CWP complex are primarily waste energetic materials from the RFAAP. The wastes that are stored and treated in accordance with this Permit are hazardous due to their ignitability (D001), reactivity (D003), and/or toxicity for certain metals and organics. In addition, several listed wastes may be treated in the EWI-CWP complex. These include discarded commercial chemical products that result from spills in the various process areas or other commercial chemical products that are unsuitable for use.

The waste energetics are capable of detonation or explosive reaction if subjected to a strong initiating source or if heated under confinement. A source of published documentation that identifies the reactivity of these wastes is provided in "*Dangerous Properties of Industrial Materials*," by N. Irving Sax (5th Edition, see dinitrotoluene (DNT), p.619-620 and nitrates p. 853). However, once the wastes are processed through the grinder tanks and placed into a slurry mixture, that mixture is no longer reactive or ignitable. Despite this, the waste slurry continues to be managed in accordance with 40 CFR §264.17 due to the hazardous nature of the waste constituents. All wastes, regardless of whether they are slurried or not, are protected from accidental ignition or reaction through the use of instrumented controls and engineering design. The sections below outline the Permittee's approach to storing and treating these potentially reactive wastes.

IV.Ca.2. Precaution to Prevent Ignition or Reaction of Reactive Wastes

All propellant manufacturing, storage, testing, waste management, and support activities (except administration) are included in limited access areas of the facility. Information signs warning against smoking and the introduction of flame-producing devices are displayed at all normally used entrances to the limited areas. A security guard stops each entering vehicle and requests all flame producing devices in the vehicle. In addition, "Unauthorized Personnel Keep Out" signs have been placed at the Grinder Building and locations within the EWI-CWP complex that manages hazardous waste. Signs are also provided at each of the unit entrance lights that read "DO NOT ENTER AREA WHILE RED LIGHT IS ON". All visitors and non-assigned personnel are required to check-in at the operations control center (OCC) before entering the area. All vehicles must enter the active area of the complex through access-controlled gates.

RFAAP has several operating standards aimed at preventing ignition or reaction of the waste energetic materials.

1. Sparks are avoided at the hazardous waste facilities by requiring all operating personnel to wear conductive shoes when involved with energetic waste operations.

2. Heat or spark producing, electrically powered, or impact tools required for maintenance are allowed in operating buildings only with written permission.

In addition to these standards, one of RFAAP's maintenance operating practices is to assure that the application of a maintenance product (*e.g.*, adhesive, lubricant, solvent, *etc*.) will not result in a heat-producing chemical reaction when in contact with the energetic materials. All products to be used by maintenance personnel that have not been proven compatible must be assured by laboratory testing prior to use.

IV.Ca.3. Preventive Procedures, Structures and Equipment

Hazards in the unloading, loading, and handling operations at the Grinder Building will be minimized through implementation of safety precautions included in the facility operating procedures and employee training.

Once the waste propellant containers have safely arrived at the Grinder Building, the contained energetic materials are ground and added to the slurry tanks. Once mixed with water, the resulting energetic waste slurry is no longer ignitable or reactive. The slurry is transported to the rotary kiln incinerators through pipelines. All control of these operations is provided remotely in the OCC. With the exception of certain emergency scenarios (*e.g.,* plugged piping or pipeline breaches), there is no personnel interaction with the wastes once they are ground and loaded into the slurry tanks.

The tanks themselves are situated such that a reaction within them will be localized to the Grinder Building or the area immediately around it. Berming is provided adjacent to the Grinder Building that will direct any event at the building in the opposite direction from the other production equipment (into an unoccupied area away from the fenceline). The Grinder Building is set at the furthest location from the plant roadways and nearby New River. Adequate protective distances are provided between the waste management area and any public ways, streets, alleys, or an adjoining property line that can be built upon.

IV.Ca.4. Management of Reactive Wastes in Tanks

The wastes are transported to the Grinder Building (Building No. 613) where they are ground and mixed with water to form a slurry. Experimental test results given in the final report entitled "Evaluation of Burning H-6 Propellant in the Waste Propellant Incinerator," (Production Engineering Project PE-543, November 20, 1975) have shown for a variety of propellants and explosives this aqueous slurry will provide a suitable transport medium for energetic wastes. The aqueous slurry also serves as an effective suppressor to flame or explosive shock. The water will prevent localized initiations that could occur during normal or abnormal operating conditions and that would result in a sustained burning reaction or explosion. The wastes are piped over to the rotary kiln incinerators in a slurry form and injected into the incinerator in that form.

The rotary kiln incinerators are operated remotely from the main control room. Personnel will not come in direct contact with the slurry mix since it is a remote operation and all slurry is in an enclosed recirculating system. In order to prevent settling in the tanks, each kiln feed storage tank is equipment with an agitator. Settling in the slurry lines is prevented by continuously recirculating the slurry through the recirculation loop. When the rotary kiln incinerators are in operation, a portion of this flow is directed through the pickup line to the operating incinerator. Continuous operation of the loop ensures good circulation in all lines and prevents the possibility of accumulation of solids in critical areas.

Module V - Incineration

V.A. GENERAL SPECIFICATIONS - EWI

This Permit authorizes the simultaneous operation of two equivalent incinerators (i.e., 440 and 441). Per 40 CFR § 264.340, the operating requirements for these incinerators are no longer regulated under RCRA once a facility demonstrates compliance with the HWC NESHAP and submits their Notification of Compliance (NOC), unless the permit writer determines that limits above and beyond those required by the HWC NESHAP are necessary to protect human health or the environment. The potential impact of these units on human health and the environment was evaluated by conducting Human Health and Ecological Risk Assessments of the modeled emissions (based on trial burn data) from both incinerators operating simultaneously. The Human Health and Ecological Risk Assessments were approved by the Department on January 15, 2021. No permit limits other than those identified herein and those required by the HWC NESHAP were necessary based upon the results of the risk assessments.

V.Aa. GENERAL SPECIFICATIONS – EWI-CWP

This Permit authorizes the simultaneous operation of three thermal treatment incineration systems at the RFAAP. This includes two identical rotary kiln incineration (RKI) systems and a contained burn chamber (CBC). This Module includes all of the engineering specifications necessary for the Department to evaluate the appropriateness of these systems for managing hazardous waste generated at the RFAAP and described in the Waste Analysis Plan, Attachment II.Ba in Module II.

Per 40 CFR §264.340(b), the new incinerators are not subject to the RCRA emission standards or operating limitations provided under Part 264, with the exception of the following:

- The requirements of Subparts A through H, BB and CC of Part 264
- The closure requirements of 40 CFR §264.351 (removal of hazardous waste from incineration equipment)

To assess the potential impact of these units on human health and the environment and satisfy their obligations under 40 CFR §270.32(b)(2), DEQ has requested that RFAAP conduct a Human Health and Ecological Risk Assessment of the modeled emissions from all three units operating simultaneously. This assessment will be performed using data collected during the HWC NESHAP CPT or a separate risk burn test conducted according to an approved emissions test protocol. Pursuant to 40 CFR §270.32(b)(3), if, as a the result of this assessment DEQ determines that conditions are necessary in addition to those required under 40 CFR Part 63

Subpart EEE to ensure protection of human health and the environment, DEQ will include those terms and conditions in this permit.

V.B. PERMITTED AND PROHIBITED WASTE FEED - EWI

V.B.1. The only wastes that the Permittee may incinerate are those specified in Attachment II.B (see Module II). Whenever waste is being incinerated, the Permittee shall not include any other materials in the feed to the incinerator except water from the plant water supply or surrogate waste materials injected for the purpose of compliance testing.

V.B.2. The Permittee shall incinerate only slurried waste. The slurry shall be managed in accordance with the Waste Analysis Plan (Attachment II.B) and the Procedures for Handling Reactive Wastes in Tanks (Attachment IV.C).

V.B.3. The Permittee shall incinerate only waste generated at the facility, as specified in Attachment II.B. The Permittee shall not incinerate any waste generated outside of the facility.

V.Ba. PERMITTED AND PROHIBITED WASTE FEED – EWI-CWP

V.Ba.1. The only hazardous wastes that the Permittee may incinerate are those specified in Attachment II.Ba (see Module II).

V.Ba.2. All wastes that are incinerated shall be managed in accordance with the Waste Analysis Plan (Attachment II.Ba). Those wastes treated in the rotary kiln incinerators and managed in the Grinder Building operations shall also comply with the Procedures for Handling Reactive Wastes in Tanks (Attachment IV.Ca).

V.Ba.3. The Permittee shall incinerate only waste generated at the facility by RFAAP or tenant organizations, as specified in Attachment II.Ba. The Permittee shall not incinerate any waste generated outside of the facility.

V.C. INSPECTION REQUIREMENTS - EWI

The Permittee shall inspect the incineration unit in accordance with the Inspection Schedule, Attachment II.C (see Module II) The Permittee shall visually inspect the incinerator and the associated equipment thoroughly (including stack, pumps, valves, pipes, flanges, welds, bolted connections, threaded connections, etc.) for leaks, spills, rust, wear, and signs of tampering.

V.Ca. INSPECTION REQUIREMENTS – EWI-CWP

The Permittee shall inspect the incineration units in accordance with the Inspection Schedule, Attachment II.Ca (see Module II). The Permittee shall visually inspect the incinerators and the associated equipment thoroughly (including stack, pumps, valves, pipes, flanges, welds, bolted connections, threaded connections, *etc*.) for leaks, spills, rust, wear, and signs of tampering.

V.D. PERSONNEL TRAINING - EWI

The Permittee shall follow the procedures in Personnel Training, Attachment II.D (see Module II).

V.Da. PERSONNEL TRAINING – EWI-CWP

The Permittee shall follow the procedures in Personnel Training, Attachment II.Da (see Module II).

V.E. CONTINGENCY PLAN - EWI

The Permittee shall follow the procedures in the Contingency Plan, Attachment II.E (see Module II).

V.Ea. CONTINGENCY PLAN – EWI-CWP

The Permittee shall follow the procedures in the Contingency Plan, Attachment II.Ea (see Module II).

V.F. CLOSURE - EWI

The Permittee shall follow the procedures in the Closure Plan, Attachment II.F (see Module II).

V.Fa. CLOSURE – EWI-CWP

The Permittee shall follow the procedures in the Closure Plan, Attachment II.Fa (see Module II).

V.G. RECORDKEEPING

V.G.1. The Permittee shall record and maintain in the operating record all the monitoring and inspection data compiled under the requirements of this Permit.

V.G.2. The Permittee shall record and maintain in the operating record all waste feed determinations made pursuant to the Waste Analysis Plan, Attachment II.B (see Module II).

V.Ga. RECORDKEEPING – EWI-CWP

V.Ga.1. The Permittee shall record and maintain in the operating record of the monitoring and inspection data compiled under the requirements of this Permit.

V.Ga.2. The Permittee shall record and maintain in the operating record all waste feed determinations made pursuant to the Waste Analysis Plan, Attachment II.Ba (see Module II).

TABLE V.2-1

MONITORING REQUIREMENTS FOR BOTH 440 AND 441 INCINERATION SYSTEMS

Operating Parameter Instrument Description	Instrument Location and Identification	Frequency Monitoring	Frequency Calibration
Slurry Tank 1A Level Control	Grinder Building LI-TIA	Continuous	Monthly
Slurry Tank 1B Level Control	Grinder Building LI-TIB	Continuous	Monthly
Slurry External Loop Feed Loop Pressure – dP Transmitter	Common pump discharge PT/PI	Continuous	Monthly
Slurry External Loop Loop Discharge Flow – Ultrasonic Flow Transmitter	Common loop discharge FT/FI	Continuous	Monthly

* Recorders shall be calibrated monthly

Module V– LIST OF ATTACHMENTS

The following Attachments are incorporated, in their entirety, by reference into this Permit. These incorporated attachments are enforceable conditions of this Permit. Some of the documents contain excerpts from the Permittee's Hazardous Waste Permit Application. The Department has, as deemed necessary, modified specific language excerpted from the permit application. Additional modifications are prescribed in the Permit Conditions (Modules I through VI), and thereby supersede the language of the attachments. Facility operations shall be in accordance with the contents of the Attachments and this Permit.

Attachment V.A – Plans and Specifications for Incinerators

Attachment V.Aa – Plans and Specifications for Incinerators for the EWI-CWP Complex

Attachment V.A – Plans and Specifications for Incinerators

The incinerator complex at RFAAP consists of two identical rotary kiln incinerators, referred to as Incinerators 440 and 441. These two units are identical in every aspect of their design and operations. All components, materials, and proportions are the same.

The two incinerators were designed to incinerate off-specification or production waste energetic mixtures. These mixtures are brought from the production area to the Grinder Building, where they are ground and mixed with water to form a slurry. A pump system located in the Grinder Building supplies both incinerators with this slurry feed on a continuous basis. The incinerators and Grinder Building may be in operation 24 hours per day, 365 days per year. Downtime occurs due to changes in production demands, scheduled maintenance periods, or unscheduled maintenance activities relating to mechanical difficulties.

The incinerators burn a wide variety of energetic mixtures based on the production schedules of the facility. Figure V.A-1 is a process schematic of the incinerator facility at RFAAP. Each incinerator consists of the following components:

- Waste Feed System (not shown)
- Combustion System
- Gas Conditioning and Air Pollution Control System
- Induced Draft Fan (Prime mover)
- Exhaust stack

In addition to the components listed above, each incinerator is also equipped with an instrumentation package to monitor, control and record the combustion process parameters.

In accordance with 40 CFR 264.340(b), *Integration of MACT Standard*, and 270.62, all RCRA waste analysis, performance standards, operating requirements, monitoring requirements, and inspection requirements for the incinerators no longer apply once the facility demonstrates compliance with the Hazardous Waste Combustor National Emission Standards for Hazardous Air Pollutants (HWC NESHAP) and submits their Notification of Compliance. RFAAP completed this process in May 2004. Accordingly, most of the information specified by 40 CFR 270.19 is no longer applicable. Details related to operation and design of the incinerators and associated equipment are now addressed under the Clean Air

Act’s HWC NESHAP. General RCRA requirements for these incinerators are addressed elsewhere in this Permit. A summary of the permitted system is provided in the sections that follow.

V.A.1. Waste Feed System

Off-specification and production waste propellant mixtures are brought from the production area to the Grinder Building (Bldg. 442) in specially labeled 20-gallon waste containers, where they are ground and mixed with water to form a slurry. Prior to the preparation of each batch, or grind, the propellant buckets are loaded onto a suspended conveyor system, which transports the buckets up to the grinder feed chute. The actual process of grinding the propellant and preparing the batch is controlled by the operators in the control room. Ground propellant is fed to one of two 1,900-gallon slurry feed tanks and is mixed with makeup water to form the slurry for incineration. A pump system located in the Grinder Building supplies both incinerators with slurry feed on a continuous basis.

When the waste preparation or grinder operation is started, the conveyor carries each propellant bucket up to the feed chute and dumps the contents of the bucket into the chute. The bulk propellants travel down the feed chute to the grinder, where they are chopped into small pieces of propellant. This propellant is then dropped into one of the slurry feed tanks. Once the entire batch of propellant has been ground and added to the feed tank, the tank is decanted down to the desired level. Before the tank is sent to the slurry loop and the incinerators, the agitator on the tank is started to fully mix the propellant and water into the waste slurry mixture.

The slurry feed system is a recirculating flow loop from the slurry tanks to the incinerators' feed pumps and back to the slurry tank. The slurry feed pump, located in the Grinder Building, pumps the slurry around this flow loop. At each incinerator, another pump pulls slurry from the loop into the slurry pickup line and injects it into the kiln at the burner end. The slurry recycle line is equipped with a water flush system to purge the lines of slurry when the slurry pumps are turned off.

V.A.2. Combustion System

The incinerators’ combustion system includes a rotary kiln primary combustion chamber followed by an afterburner. The primary fuel for both of these combustion chambers is natural gas.

Waste feed enters the rotary kiln through the slurry feed nozzle. The rotary kiln is designed to incinerate water based slurries of bulk explosives and propellants. The kiln shell is a horizontal cylinder that rotates between two fixed ends or breechings. The kiln rotation causes a tumbling action that allows the water in the slurry to evaporate and the waste explosive or propellant solids to burn in a controlled environment.

To help prevent fugitive emissions between the fixed breechings and rotating drum, each kiln is equipped with seals at both the feed and discharge ends. These seals prohibit fugitive emissions from the kiln and minimize air infiltration.

Inert ash from incineration of the propellant is removed from the discharge breeching by a dry ash removal system. This system consists of a slide gate that is periodically opened, with the waste feed off, to allow ash to empty into an ash holding bin.

Combustion gas exits the kiln and enters the afterburner through a refractory lined duct. The afterburner is a stationary horizontal cylinder with flue gas inlet and outlet ports located on either end. The afterburner incorporates an internal vertical baffle system that increases the gas turbulence to promote effective combustion gas mixing.

V.A.3. Gas Conditioning and Air Pollution Control System

Each incineration system includes a dedicated gas conditioning and air pollution control (APC) system that is designed to condition and remove acid gases, particulate, and metals from the combustion gases. The gas conditioning and APC devices in use at the RFAAP include the following units:

- Evaporative cooler
- Fabric filter baghouse
- Gas pre-cooler
- Packed bed scrubber

In addition to the components mentioned above, the brine system, including the neutralization and brine tanks, circulates brine through the wet APC devices to cool and scrub the combustion gases.

V.A.3.1. Evaporative Cooler

High temperature flue gases exiting the afterburner pass into the evaporative cooler, where the gases are cooled before entering the downstream APC system. The evaporative cooler is a vertical cylinder with the gas entrance on the top center and the gas exit on the side bottom. The evaporative cooler is considered a piece of gas conditioning equipment, serving the sole purpose of cooling the flue gases before they enter the fabric filter baghouse. No air pollution control is intended with its design.

The evaporative cooler is equipped with a bottom hopper to collect any residue that may drop out of the flue gas as it passes through the cooler on its way to the APC. A rotary valve on the hopper discharge removes the ash, while providing a seal to prevent air in-leakage. Ash is collected in a holding bin and disposed of with kiln ash.

V.A.3.2. Fabric Filter Baghouse

Cooled combustion gases exiting the evaporative cooler are routed to the fabric filter baghouse. The fabric filter is a pulse-jet style baghouse designed to remove particulate matter from the flue gas. The filter bags are suspended from an internal tubesheet near the top of the baghouse. This tube sheet separates the outlet or clean side of the baghouse from the inlet or dirty side. As flue gases flow through the filter bags from the outside to the inside, particles are collected on the outside of the bags. Inside each bag is a rigid wire cage that keeps the filter bag from collapsing while under vacuum. Upon exiting the bags, the gas enters a clean gas outlet plenum and exits the module through a ductwork connection.

As the filter cake on the outer surface of the bags builds up, the pressure drop through the fabric filter increases. When the pressure drop reaches a programmed level, the pulse-jet cleaning cycle is initiated. During the cleaning cycle, each bag is pulsed with a blast of compressed air. Each row of filter bags is pulsed in a programmed sequence by activating solenoid valves that are connected to a common compressed air manifold. The pulse of compressed air sends a pressure wave down the interior of the filter bag, causing the bag to bulge slightly. This pulsing action causes the filter cake on the outside of the bag to be knocked off. As the filter cake is knocked off, it falls to the bottom conical hopper of the baghouse where it accumulates. The cleaning cycle continues to pulse the filter bags in sequential order until the baghouse pressure drop returns to a pre-set minimum. A rotary valve on the discharge hopper removes the accumulated fly ash, while providing a seal to prevent air in-leakage. Ash is collected in a holding bin and disposed of with kiln ash.

V.A.3.3. Gas Pre-Cooler

Combustion gas exits the fabric filter and travels through a duct into the gas pre-cooler. The pre-cooler is a direct contact quench system that utilizes multiple water sprays to cool the gas from the baghouse exit temperature to the saturation temperature. The pre-cooler is a vertical cylinder, equipped with a conical bottom sump for collecting excess water and residual contaminants. This excess brine water is gravity drained from the pre-cooler bottom to the neutralization tank.

V.A.3.4. Packed Bed Scrubber

Once cooled and saturated in the pre-cooler, the combustion gases are routed to the packed bed scrubber, which is designed to scrub acid gases. Gas flows through the scrubber upwards from the entrance at the bottom of the scrubber through the packing and exits at the top. Gas flow is countercurrent to water flow in this scrubber. The excess water collected at the bottom of the scrubber is gravity drained from the bottom sump to the neutralization tank.

The scrubber is a vertical cylindrical vessel that houses a section of scrubber packing to increase gas to liquid interaction and help achieve the design control efficiency. One spray nozzle located above the packing in the scrubber sprays water countercurrent to the gas flow. Four additional nozzles located below the packing, spray water in the direction of the gas flow. The spray nozzles are supplied with brine water from the scrubber/neutralization recycle pumps.

V.A.4. Induced Draft Fan

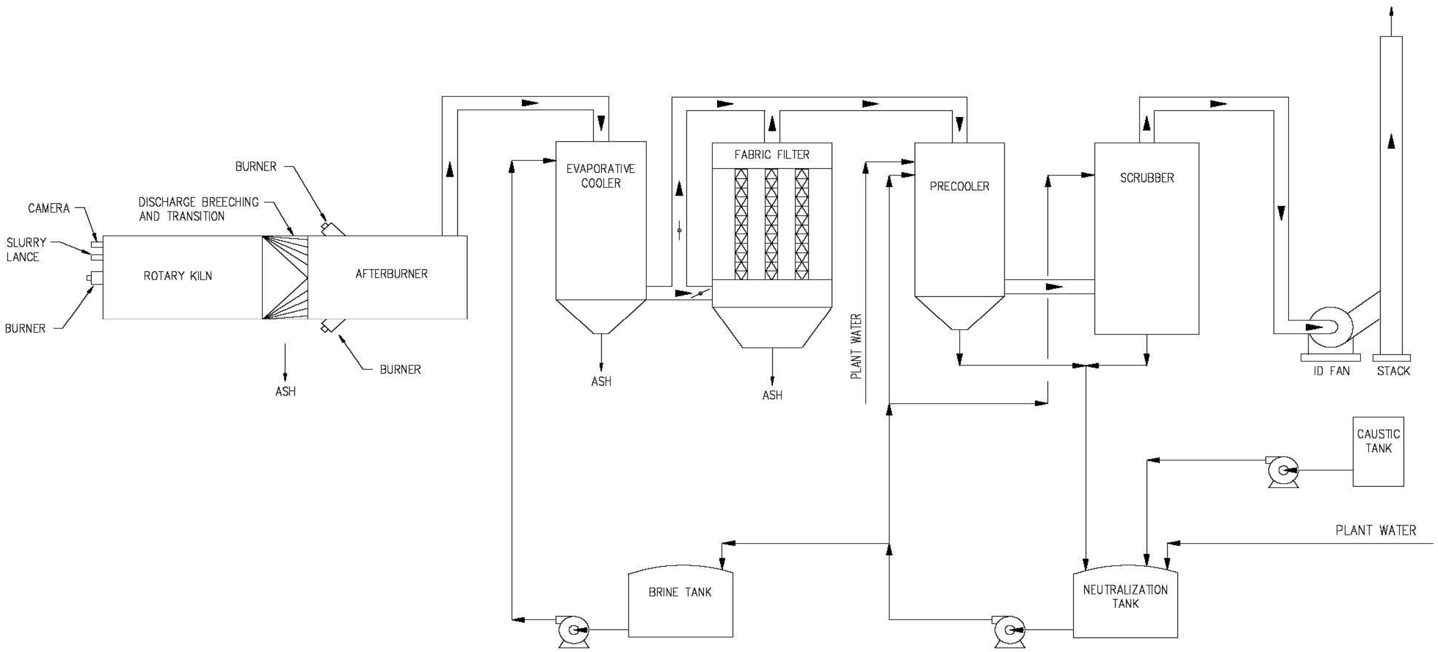
The ID fan is located downstream of the packed bed scrubber. The ID fan is the prime mover and provides the necessary vacuum to overcome the pressure drop through the entire incineration system. The fan is equipped with a variable speed drive that controls flow and draft to maintain a negative pressure at the rotary kiln.

V.A.5. Exhaust Stack

The discharge of the ID fan is routed into the exhaust stack, where it is then dispersed into the air as a cooled, scrubbed gas stream. The exhaust stack is a 35-foot high cylinder. It is equipped with an inlet duct, inspection port and upper and lower sampling ports.

Figure V.A-1 – Incinerator Process Schematic

FIGURE v.A-1
INCINERATOR PROCESS SCHEMATIC



Attachment V.Aa - Plans and Specifications for Incinerators for the EWI-CWP Complex

V.Aa.1. System Overview

The EWI-CWP complex at RFAAP consists of three incinerators that are used for the thermal treatment of hazardous waste:

- One contained burn chamber (CBC), and
- Two identical rotary kiln incinerators (RKIs).

The CBC (Account No. 615-CBC-50202) receives solid hazardous wastes that do not need to be ground for thermal treatment, as well as those that cannot be ground because they are contaminated with foreign object debris (FOD) or other safety concerns. The two rotary kiln incinerators (Accounts 616 and 617, referred to as Kiln No. 1 and Kiln No. 2, respectively) process wastes that have been ground into a slurry for safe thermal treatment.

Two additional thermal treatment systems are included in the EWI-CWP complex. These include the Car Bottom Oven (Account No. 615-R-50006) and a Small Decontamination Oven (Account No. 615-R-50053) that are used to thermally decontaminate metal parts. The treated materials are not hazardous wastes under the RCRA program and are generally being decontaminated for reuse or scrapping of the metal parts.

Figure V.Aa-1 provides a general overview of the entire incineration process. As shown in the diagram, the system can accept hazardous wastes in either solid or liquid form. Non-hazardous wastes are also accepted to supplement natural gas requirements and for decontamination. Those hazardous wastes being fed to the RKIs are first processed through the Grinder Building and worked into a slurry for incineration. Solid, non-hazardous combustible wastes are loaded onto a system at the kiln and fed via a cart and shredder system. Those wastes being processed in the CBC are loaded onto trays in the Loading Building and are transferred via a trolley system (without physical or chemical alteration) to the CBC. The emissions from the incineration systems are treated in an extensive air pollution control (APC) system. Each RKI unit is equipped with an APC system that includes an evaporative cooler, baghouse, selective catalytic reduction (SCR) unit, adiabatic quench and packed bed scrubber. The emissions from the CBC can be directed to either APC system based on which unit is operating. Each APC system then exhausts through a separate exhaust stack.

The incineration systems and associated waste preparation processes may be in operation 24 hours per day, 365 days per year. Downtime occurs as necessary due to changes in production demands, scheduled maintenance periods, or unscheduled maintenance activities relating to mechanical difficulties. All operations are monitored with a state of the art instrumentation package that provides remote control of all operations and records process conditions. P&IDs developed for the design of each of the major systems associated with the CBC and the RKIs are maintained on-site and available for inspection upon request by DEQ. Note that the Kiln No. 1 and Kiln No. 2 systems are identical; P&IDs for both have been provided for completeness.

While the specific RCRA operating requirements and emission standards for incinerators do not apply to these units pursuant 40 CFR §264.340(b), the incinerators remain hazardous waste treatment units and as such, a description of their components and design is appropriate for inclusion in this Permit. The sections that follow provide a description of each incineration system and the associated APC systems. Note that the descriptions provided and drawings referenced reflect the proposed design for the equipment. These descriptions and drawings will be updated as appropriate after as-built drawings and descriptions are available. Also note that descriptions are also provided of the decontamination units at the facility. These units are used to process metal parts and are not subject to regulation under this Permit or RCRA. Descriptions of them are only provided to present a complex picture of the EWI-CWP complex and its functionalities.

V.Aa.2. Container Burn Chamber System

The CBC is a vertical incineration chamber used to process those wastes that cannot be ground via the Grinding operation or that are otherwise better to process in the CBC than in the rotary kiln incinerators. Plan and elevation views of the CBC system are maintained on-site and available for inspection upon request.

Wastes destined for treatment in the CBC arrive at the Car Bottom and CBC Loading Building (Building 614) and are placed into one of the six storage bays for temporary storage prior to being batched into the CBC. These bays are each designed to contain the blast from up to 200 pounds of Class 1.1 energetic material. The CBC utilizes trays to hold the waste being incinerated, much like those that are used in open burning operations. The trays are loaded with waste by operators in the Loading Building. When the operators are ready to load a tray for the CBC, they remove the wastes from the temporary storage bay and place them in the CBC trays shown in Figures Va-27 and Va-28. Once loaded, the tray is covered with a lid and is transferred to the CBC via a trolley system (as directed from the operations control center (OCC)). Once at the CBC, a remote loading fixture is used to remove the lid from the tray and transfer the tray from the trolley onto the CBC door platform. From here, the operator in the OCC commands the door to load into the CBC and confirms it is properly secured before initiating the treatment process.

Treatment in the CBC is a fairly simple process. Once securely loaded into the chamber, the material in the trays is ignited with a small 0.5 million British thermal unit per hour (MMBtu/hr) burner assembly. When treating those wastes that require no aid to burning, the burner shuts off as soon as the wastes ignite. When treating those wastes that do require an aid to burning, such as the pit wastes included in Group 20, the initiating burner and two other 0.5 MMBtu/hr burners stay on during the duration of the treatment process to provide direct flame impingent on the materials in the CBC tray. Treatment continues until all energetic material has been initiated. This condition is indicated by a combination of factors, including the pressure within the CBC as well as the temperature of the tray in which the wastes are being held during treatment.

The CBC gets its name from the way in which it manages the combustion gases from the treatment operation. Unlike a traditional incinerator, the CBC contains the gases from the combustion process and slowly meters them to the downstream system, pulling ambient air into the off-gas stream as necessary to provide a constant flue gas flow rate from the chamber. This helps to provide uniform sizing of downstream equipment for wastes that can result in significantly different volumes of gas generation. Because it contains the gases, the CBC is an ASME pressure-rated vessel (ASME Pressure Code VIII, Division 2). It is rated for a maximum pressure of 200 pounds per square inch gage (psig).

In this system, the contained flue gases are slowly metered to a downstream afterburner operating at 1,400 degrees Fahrenheit (°F) and are then sent to one of the two secondary combustion chambers (SCCs) and subsequent APC systems described below for the kilns. The afterburner in this instance is not provided to enhance organics destruction, but instead, is intended to heat the gases to a point that any nitroglycerin vapors in the off-gases do not condense on their way to the high-temperature SCC. A 5-horsepower (hp), 3,450-revolution per minute (rpm) booster fan is provided in the system to aid in transfer of the flue gases from the CBC to the SCC. Once at the SCC, the flue gases proceed as described in Section V.Aa.3 for the rotary kiln system.

After the waste has been treated in the CBC, the door on the chamber will open and the hot tray will come out of the chamber. A glycol cooling system is provided to aid in cooling of the tray as it sits on the trolley (the trolley car is provided with a glycol-based heat exchanger that cools the platform on which the tray sits). Once the door is fully retracted, the remote loading mechanism is used to place the lid on the tray, remove it from the door platform and transfer it back to the trolley. From here, the tray is transferred to a covered area, where it is unloaded into a cooling rack until it is needed to process another batch of waste. When it is needed for a new batch of waste, the tray transfer mechanism removes the tray from the cooling rack and places it in the trolley, which transfers it back to the building. At the building, the operator uses a high efficiency vacuum system to remove any ash debris from the tray and then reloads the tray with another batch of wastes. The vacuumed ash debris is collected in a 55-gallon drum in a satellite accumulation area. Once full, the drum is sealed and transferred to the central accumulation area adjacent to the Loading Building.

V.Aa.3. Rotary Kiln System

The two identical rotary kiln systems are intended to thermally treat those wastes that must be put into a slurry prior to treatment. This includes the vast majority of off-specification product waste that is generated. Plan and elevation views of each kiln system will be maintained on-site and available for inspection upon request by DEQ.

Note that the Kiln No. 1 and Kiln No. 2 processes are identical, mirror images of one another. Therefore, only a singular process description is provided below. Drawings of each system have been provided for completeness.

As discussed previously in Module IV, hazardous wastes that are destined for treatment in the RKIs are collected from central accumulation areas and transferred to the Grinder Building, where they are processed through the grinder operation and stored in one of three kiln feed storage tanks. The combustible non-hazardous solid wastes that are used to supplement natural gas usage are collected and brought directly to a feed conveyor adjacent to the kiln in which they will be processed. The wastes, which are containerized in either fiberboard drums, plastic drums, or plastic bags, are manually loaded onto the conveyor and staged for destruction. After the conveyor is loaded, the operator will leave the area and notify the OCC that the system is loaded and ready to process waste. The kilns can operate on just waste slurry or a combination of waste slurry and contaminated solid waste. At no time will the solid waste be burned by itself; there will always be a hazardous waste feed stream (slurry) to accompany it.

Once a tank is selected for treatment, the operator will put the tank into the circulation loop from his station at the OCC and select in which incinerator they wish to process the waste. Waste can be processed in one kiln individually or both kilns simultaneously. Once all operating conditions are within regulatory and safety limits, the operator will initiate waste slurry feed and, if available, the containerized non-hazardous waste feed. If the kiln is processing contaminated combustible waste, the operator will have to remotely index the conveyor for each charge of solid waste that is fed. When a container is indexed on the conveyor, it will ride over a weigh scale, which will record the weight of the container, and will then drop the container into the waste cart. When prompted by the operator, the cart dumper will raise the waste container up to the shredder that sits above the kiln and will drop the container into the shredder. The container will process through the shredder and drop into the kiln. The control system will automatically adjust natural gas and air flows to the 10 MMBtu/hr burner, as well as other process conditions as necessary to adjust for variations caused by the addition of each type of waste feed.

The feed rate of both hazardous and non-hazardous wastes to the kilns is carefully metered, with the liquid flow rate of the slurry being continuously measured and the weight and time of each solid waste charge being measured and recorded. These measurements are used to comply with total feed rate limits and constituent feed rate limits under other regulatory programs.

Wastes will process through the kiln based on the rate of rotation of the kiln. Based on the dimensions of the kiln, it is expected that a container of waste will take approximately 32 minutes to process through the kiln at a rotational speed of 1.5 rpm. This speed can actually be adjusted during normal operation based on the rate of incineration in the kiln, as well as the process response to the waste burning operations. It is expected that during normal operations, the rotational speed will vary from between 1 to 3 rpm, resulting in waste residence times from approximately 20 to 60 minutes.

Combustion gases from the incineration process will exit the kiln and proceed downstream to the SCC. In this chamber, the temperature of the flue gases will be raised to ensure adequate destruction of all organic components of the waste feed. Any non-combustible components of the waste feed, such as metal rims from fiberboard drums, or heavy, bottom ash, will exit the kiln and flow into a wet ash collection system. The ash will fall through a downcomer pipe into a ash wheel that is submerged in water. The water creates a seal between the outside environment and the kiln, preventing fugitive emissions, and serves as a coolant for the ash. As the ash wheel rotates, the discharged ash is pushed into a collection tote that sits under the kiln.

From the SCC, the flue gases are rapidly quenched in an evaporative cooler before they enter the downstream APC system. The evaporative cooler reduces the temperature of the flue gas from the approximate SCC outlet temperature of 1,800°F to 350°F so that it can safely enter the fabric filter baghouse without damaging the fabric filters. The evaporative cooler is a dry-bottom device, in that all of the water injected through the two lances evaporates by the time it reaches the bottom of the chamber. This evaporation causes the rapid cooling of the flue gas.

The baghouse contains 248 Gortex-coated fiberglass bags that remove the particulate-based pollutants from the flue gas stream. The single compartment, cylindrical baghouse is a pulse-jet style unit. As flue gases flow through the filter bags from the outside to the inside, particles are collected on the outside of the bags. Inside each bag is a rigid wire cage that keeps the filter bag from collapsing while under vacuum. Upon exiting the bags, the gas enters a clean gas outlet plenum and exits the module through a ductwork connection.

As the filter cake on the outer surface of the bags builds up, the pressure drop through the fabric filter increases. When the pressure drop reaches a programmed level, the pulse-jet cleaning cycle is initiated. Each row of filter bags is pulsed with a burst of compressed air in a programmed sequence by activating solenoid valves that are connected to a common compressed air manifold. The pulse of compressed air sends a pressure wave down the interior of the filter bag, causing the bag to bulge slightly and the filter cake on the outside of the bag to be knocked off. As the filter cake is knocked off, it falls to the bottom conical hopper of the baghouse where it accumulates. The cleaning cycle continues to pulse the filter bags in sequential order until the baghouse pressure drop returns to a pre-set minimum. A rotary valve on the discharge hopper removes the accumulated fly ash, while providing a seal to prevent air in-leakage. Ash is collected in a holding bin and disposed of with kiln ash.

After the baghouse, the flue gases are reheated by a 6 MMBtu/hr duct burner to raise the temperature to the optimal treatment for the downstream SCR unit. Once in the SCR, the now 650°F flue gases are mixed with anhydrous ammonia and reacted over a catalyst to reduce the nitrogen oxides (NOx) in the flue gas. The rate of ammonia injection is controlled by a NOx analyzer mounted on the outlet of the SCR and is adjusted to maintain a desired outlet concentration. The anhydrous ammonia is supplied through a pipeline from an ammonia tank farm located adjacent to the old incinerator control room.

Once passed through the SCR, the flue gases move into the wet scrubbing section of the APC system for acid gases removal. The adiabatic quench reduces the flue gas temperature to approximately 175°F so that it can enter the downstream packed bed scrubber without damaging its fiberglass reinforced practice (FRP) structure and Teflon packing. The direct contact quench system is not specifically designed to provide any acid gas control and includes no pH adjustment for its recycled water stream. However, the downstream packed bed scrubber does utilize caustic for pH control. Using a combination of filtered recycled water, caustic, and fresh water to supplement for evaporative losses, as well as a small blowdown stream, the packed bed scrubber is designed to provide removal of a variety of acid gases. The scrubber includes 10 feet of high-efficiency Teflon packing. The small blowdown stream from the scrubber is directed to the scrubber blowdown tank. This water is collected and primarily used as the water supply for the wet ash tank at the kiln. Any excess water is used as makeup water in the grinding process.

After leaving the scrubber, the gases are pulled through the induced draft (ID) fan before they exit through the stack to the atmosphere. The 125-hp, 1,800 rpm fan serves as the motive force for flue gases through the entire system. The suction provided by this fan maintains a negative pressure throughout the entire incineration system. The exhaust stack for the system stands 100 feet high, providing adequate dispersion of the treated flue gases into the atmosphere. Immediately prior to the stack, a horizontal section of ductwork is provided for collection of stack gas emission samples. The sampling ports are protected from a Class 1.3 event at the kiln by a fragmentation wall. This allows "on-stack" sampling of the flue gas stream while the kiln is burning Class 1.3 energetic materials.

V.Aa.4. Car Bottom Oven

The Car Bottom Oven is not a hazardous waste treatment device and is not regulated under this permit. However, it is included in the EWI-CWP complex and is described herein for clarity. The oven is provided in the system to decontaminate large metallic items for reuse or recovery. The oven is sized to accept large pieces of equipment and large pipes. It provides a reduction in employee exposure to potentially hazardous energetics, as it provides a mechanism to thermally decontaminate these items instead of having to perform multiple washings and inspections of the equipment. Exhaust from the Car Bottom Oven is vented to the CBC afterburner and through the kilns' APC system to the atmosphere.

V.Aa.5. Emergency Scenarios

The three hazardous waste incinerators are equipped with numerous safety systems and are engineered to help prevent emergency scenarios from occurring. However, like any equipment, it is expected that systems and components of these systems will fail. As such, the EWI-CWP control system is provided with a series of fail-safe measures that are designed to take the system to a safe state in the event of one of these failures. A detailed listing of these emergency scenarios was provided in Table II.Ea-3 of the Contingency Plan (See Module II). Under these emergency scenarios, the following actions may be triggered:

- Waste feeds may stop;
- The burners may shutdown;
- Venting from the CBC may be stopped (the bleed valve closed and gases contained within the CBC);
- The baghouse and SCR bypass may open; and
- The Car Bottom Oven and CBC afterburner may vent to the atmosphere.

Not all of these actions will happen during any emergency and, in the case of bypassing the baghouse or venting any component to the atmosphere, every effort will be made to prevent elements of this failure response from happening.

However, the primary goal in each of these situations is protection of human health and equipment integrity, preventing a small incident from becoming a more catastrophic one.

V.Aa.6. Risk Burn and Additional Operating Process Limits

a. RFAAP shall develop and submit a risk burn plan and risk assessment workplan to DEQ for review and approval. The due date will be one year before the planned risk burn to coincide with the due date for the Comprehensive Performance Test (CPT) Plan as specified in 40 CFR Part 60 Subpart EEE (MACT EEE). The risk burn shall also be initiated and completed in accordance with the schedule for the CPT as stipulated in 40 CFR Part 60 Subpart EEE (MACT EEE), within one year after beginning operation of the EWI-CWP.

b. RFAAP shall notify the DEQ and EPA in writing at least 30 days before the commencement of the risk burn.

c. The DEQ shall send a notice to all persons on the facility mailing list and to the appropriate units of State and Federal government announcing the scheduled commencement and completion dates for the risk burn.

d. RFAAP shall submit all data collected from the risk burn to DEQ within 30 days of completion of the risk burn.

e. RFAAP shall submit the following to DEQ within 90 days of completion of the risk burn:

(1) A certification that the risk burn has been carried out in accordance with the approved risk burn plan along with a detailed report of all collected emission samples and a proposed list of constituents for evaluation in the risk assessment.

f. Following DEQ review and approval of the risk burn report, RFAAP shall complete a risk assessment for the EWI-CWP complex using the data collected in the risk burn and the appropriate constituent list as approved by DEQ. The following milestones are provided for completion of the risk assessment:

(1) Within 6 weeks of DEQ approval of the risk burn report, RFAAP shall complete the required air modeling for the risk assessment and shall.

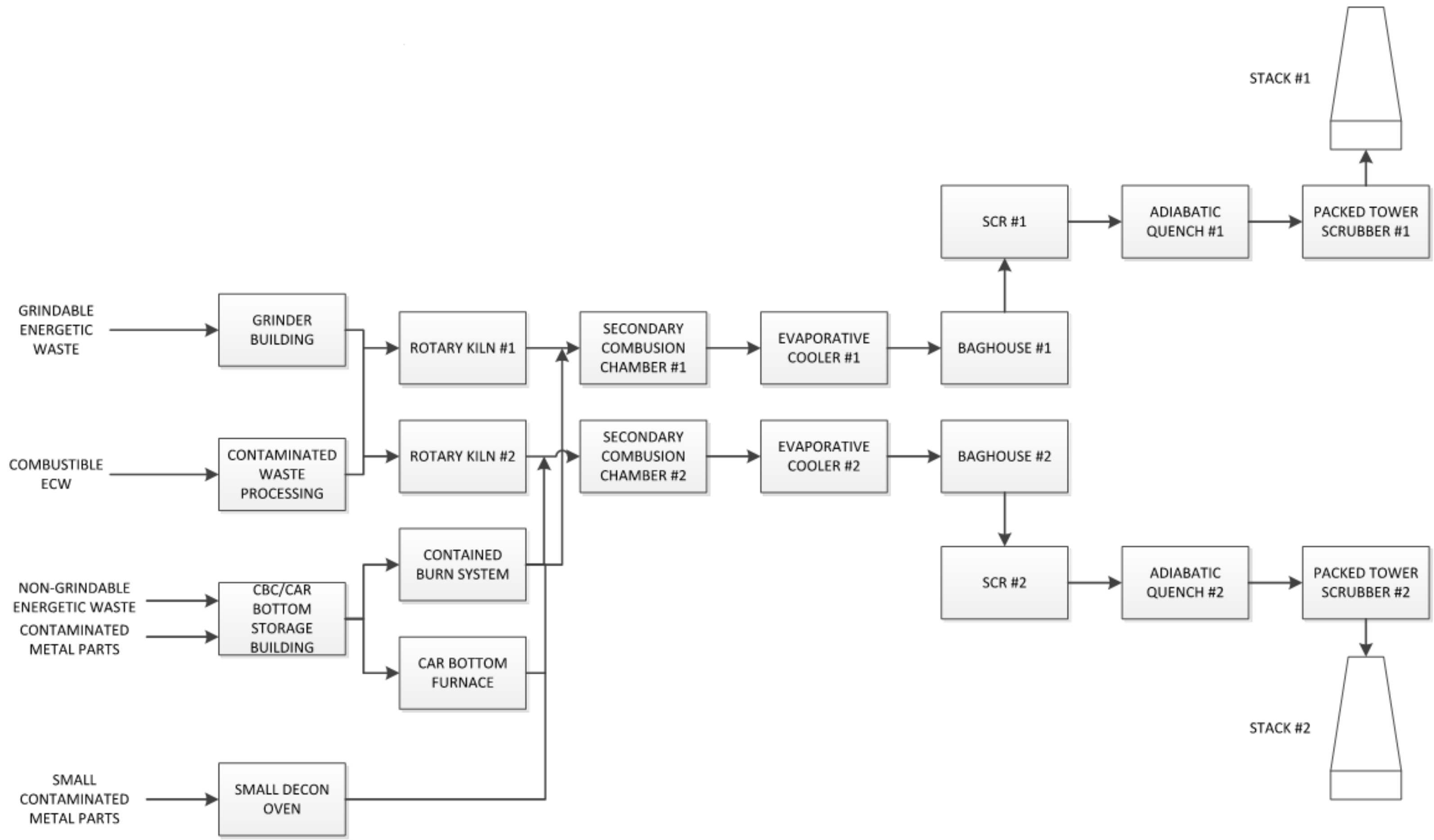
submit to DEQ the results of that air modeling with proposed locations for assessment of risk

(2) Within 12 weeks of DEQ approval of the air modeling results and receptor locations, RFAAP shall submit a human health and ecological risk assessment report for the EWI-CWP documenting the results of the risk assessment performed following the DEQ-approval risk assessment protocol for the units.

(3) The risk assessment report provided under (b) above should recommend any additional, proposed Operating Process Limits (OPLs) should the results of the risk assessment indicate that the OPLS included in MACT EEE are not protective of human health and the environment.

g. Based on the result of the risk assessment, the Director shall set additional OPLs as may be required to ensure protection of human health and the environment and modify the permit accordingly. The permit modification shall proceed according to 40 CFR §270.42.

Figure V.Aa-1 – EWI-CWP Process Schematic



Module VI - Site Wide Corrective Action

VI.A. CORRECTIVE ACTION FOR CONTINUING RELEASES; PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

The requirements of 40 CFR §264.101 are addressed by the Corrective Action Permit issued to the Permittee by DEQ which became effective on May 1, 2016 and shall remain in effect until May 1, 2026. The terms and conditions of the Corrective Action Permit issued by DEQ are adequate to fulfill the Department's requirements for facility-wide corrective action as specified in 40 CFR §264.101 as made applicable by 9 VAC 20-60-264.